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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF  
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## I. GONOLOBUS WITHIN THE GRAY'S MANUAL RANGE

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(Plate 494)

ALMOST two years ago Professor Fernald, working over his collection from Virginia, laid aside as perplexing a specimen belonging to the genus *Gonolobus* Michx. Fl. Bor.-Am. l. 119 (1803), i. e. *Vincetoxicum* Walt. Fl. Carol. 13, 104 (1788). Although there is no doubt as to the priority of Walter's name, nevertheless the continued use in Europe of *Vincetoxicum* Moench, Method. 717 (1794) produces a nomenclatural confusion of generic names which calls for some deliberation. Further, the situation was not covered in the statement of the cases for "Conservation of later Generic Homonyms," Kew Bull. (1935). Since the question must be settled sooner or later for the coming issue of the Manual, Professor Fernald requested that I assemble the literature and specimens immediately available for this study. The outcome of this work is briefly given below.

A proposal for the conservation of *Gonolobus* Michaux against *Vincetoxicum* Walter was submitted to Miss M. L. Green, Secretary of the Special Committee on Phanerogamae and Pteridophyta. Her reply is as follows, "the better way is to conserve *Vincetoxicum* Moench, Method. 717 (1794); if this is conserved, then *Vincetoxicum* Walt. becomes a nomen rejiciendum and *Gonolobus* becomes the right name for the genus." She cited fifteen additional references for *Vincetoxicum* Moench and added, "I am sure you will agree that the conservation of *Vincetoxicum* Moench is very desirable and thus it is



the simplest way to solve all difficulties." Again in another letter she pointed out that "The European Vincetoxicum is so widely used that there is every chance of its being conserved."

Superficially this seems to clear the way to use the name *Gonolobus* for our plant of southeastern United States. Unfortunately, at different times two entirely unlike concepts have been accepted for the genus: (1) Michaux's original as interpreted by Professor Asa Gray, Proc. Amer. Acad. xii. 75-79 (1877), Syn. Fl. ed. 1 and ed. 2, ii<sup>1</sup>. 102 (1878 and 1886); and (2) that of Miss Anna Murray Vail, Bull. Torr. Bot. Club, xxvi. 425-431 (1899). Many botanists earlier than A. Gray maintained *Gonolobus* as delineated by Michaux, nevertheless, Gray's particular interpretation is in sharp contrast with Miss Vail's, since both left evidence of a detailed examination of all the original material of the genus. Michaux's description of the genus *Gonolobus*, although slightly more amplified than that of Walter's *Vincetoxicum*, is unquestionably synonymous with the latter; in addition, Michaux specifically mentioned *V. gonocarpus* Walt. and *V. acanthocarpus* Walt. as synonyms of his *G. macrophyllus* and *G. hirsutus* respectively. In so doing, according to our present International Rules of Nomenclature, he invalidated his own specific names. The third species, *G. laevis*, is poorly described. The type material (fide Vail) is a mixture of flowers corresponding in part to Michaux's *G. laevis*, and foliage and fruit belonging to *Enslenia albida* Nutt., i. e. *Ampelamus albidus* (Nutt.) Britt. This fact was noted by both Miss Vail and Dr. Gray, each choosing a different part of the mixture as the type of the species.

Miss Vail, guided by foliar characters, chose the material of *Enslenia albida* Nutt.<sup>1</sup> By doing this, she believed she had cleared up the discrepancy between the original description of the species and the plants passing as such. Unfortunately, since she had restored Michaux's first two species to the genus *Vincetoxicum* Walt., she was compelled to use *G. laevis*, the only remaining species, in order to maintain the genus *Gonolobus*. That is, she took up the name *Gonolobus* in the sense of *Enslenia* Nutt. She did this apparently unmindful of the

<sup>1</sup> Rightfully the specimens of *Enslenia albida* Nutt. (*Gonolobus laevis* sensu Vail, Bull. Torr. Bot. Club, xxvi, 427 (1899), non Michx.) should be called *Ampelamus albidus* (Nutt.) Britt. as *Enslenia* Nutt. Gen. 1. 164 (1818) is antedated by *Enslenia* Raf. Fl. Ludovic. 35 (1817). Rafinesque called attention to this in Journ. Phys. lxxxix. 258 (1819) and Amer. Month. Mag. iv. 192 (1819), but Britton actually made the combination *Ampelamus albidus*, Bull. Torr. Bot. Club, xxi. 314 (1894) (as *Ampelanus*).



vast discrepancy between the floral characters (cf. particularly the contrast in the stigmas) of her chosen type and Michaux's original description of the genus. In this she has been followed by a number of American authors.

On the other hand, Dr. Gray, in his consideration of Michaux's third species, accepted that part of the material belonging to *Gonolobus* (excluding one flower-cluster of somewhat uncertain identity) as *G. laevis* and was content at that. By this interpretation *Gonolobus* Michaux is a thoroughly consistent and distinct genus. This is the concept first accepted by Robert Brown in his paper "On the Asclepiadaceae," Mem. Wern. Nat. Hist. Soc. i. 12-78 (1811), and by many later authors. On this basis the genus now contains over one hundred described species. Although approximately forty of these have been transferred to *Vincetoxicum* Walt. by Standley and others, *Gonolobus* is the name most widely known in literature and adopted by all who have done monographic work on the family.

The indication of a type-species should be a helpful factor in wholly re-establishing the older and original concept. Not having discovered any in the literature examined, I am here choosing *G. macrophyllus*, the first of the three described by Michaux, as the standard-species of the genus. This species has not only the (usually) angled pod (from which character the name is derived) but also the more important generic character of the flattened stigma. *G. macrophyllus* has been somewhat buffeted about. Gray regarded it as a variety of *G. laevis*, and Michaux automatically created an invalid name by citing *V. gonocarpos* Walt. as a synonym. Nomenclaturally the species appears to be *G. gonocarpos* (Walt.).

Below is given a key and a short summary of the species occurring within the Manual range. Plate 494 shows, in particular, buds, corolla-lobes and pollinia (figs. including retinaculum, caudicles and pollinia). It has been suggested that the more dependable characters are to be found in the pollinia [in the broader sense used to include the retinaculum (the body to which the pollen masses are attached), the caudicles (arms between the pollen masses and the retinaculum) and the pollinia (strictly speaking, the pollen masses)] than in the over-emphasized characters of the corona. From the plate it will be seen that the characters of the pollinia are perhaps [more] useful in separating groups of species rather than single species. Much broader study would be essential to any further statement on these characters.



## KEY TO SPECIES OF GONOLOBUS WITHIN THE MANUAL RANGE

- a. Follicles costate-angled, not muricate: calyx glabrous or slightly pubescent toward the apex of the lobes: crown low, 10-lobed, at base of anther-column: pollinia slenderly obovoid, attached to the retinaculum by caudicles at least 0.2 mm. long; anther-sacs inconspicuous, with narrow slits. Flower-buds short-conical, abruptly acuminate: calyx practically glabrous: corolla-lobes broadly lanceolate, usually pubescent (becoming glabrate) within, 5-7 mm. long, about twice the length of the calyx-lobes. . . . . 1. *G. suberosus*.  
 Flower-buds conical, gradually acute or acuminate: calyx glabrous or the lobes ciliolate towards the apex: corolla-lobes linear-lanceolate, glabrous within, three or four times the length of the calyx-lobes. . . . . 2. *G. gonocarpos*.
- a. Follicles muricate, not costate-angled: calyx pubescent: crown cup-shaped, as high as the anther-column or higher: pollinia semi-lunate or oblong, attached to the retinaculum by caudicles less than 0.2 mm. long; anther-sacs obvious with fairly open slits. . . . b.
- b. Flower-buds bluntly ovoid, corolla rotate. . . . . 3. *G. carolinensis*.
- b. Flower-buds oblong-conical, corolla ascending. . . . c.
- c. Crown of fairly thin texture, the long bifid lobes overtopping the anther-column.  
 Corolla white or whitish, lobes 8-12 mm. long, 1.5-2.5 mm. broad, imbricate but only slightly contorted in the bud: longer teeth of crown-lobes usually subulate . . . . . 4. *G. Baldwynianus*.  
 Corolla brownish-purple, lobes 10-15 mm. long, 3-6 mm. wide, strongly contorted in the bud: longer teeth of crown-lobes flat. . . . . 5. *G. decipiens*.
- c. Crown fleshy, as long as or slightly longer than the anther-column.  
 Corolla-lobes broadly linear, 13-15 mm. long, 2-2.5 mm. wide, dark purple. . . . . 6. *G. Shortii*.  
 Corolla-lobes slenderly linear, 9-12 mm. long, 1.5-2 mm. wide, greenish-fusces outside, purplish within . . . . . 7. *G. obliquus*.

1. GONOLOBUS SUBEROSUS (L.) R. Br. in Ait. Hort. Kew. ed. 2, ii. 82 (1811); Schultes, Syst. Veg. vi. 59 (1820); Gray, Proc. Amer. Acad. xii. 75 (1877), Syn. Fl. ed. 1 and ed. 2, ii<sup>1</sup>. 103 (1878 and 1886). *Cynanchum suberosum* L. Sp. Pl. 212 (1753). *Vincetoxicum gonocarpos* Walt. Fl. Carol. 104 (1788), in part (fide A. Gray). *V. suberosum* (L.) Britton, Mem. Torr. Bot. Club, vi. 266 (1894).

According to various manuals this species ranges from Virginia to Florida, along and near the coast. I have seen no collections from north of North Carolina.

2. *G. gonocarpos* (Walt.) comb. nov. *Vincetoxicum gonocarpos* Walt. Fl. Carol. 104 (1788), in part (fide A. Gray). *Gonolobus macrophyllus* Michx. Fl. Bor.-Am. i. 119 (1803). *G. laevis* var. *macrophyllus* Gray, Proc. Amer. Acad. xii. 76 (1877), Syn. Fl. ed. 1 and ed. 2, ii<sup>1</sup>. 103 (1878 and 1886). *G. laevis* Michx. l. c.; Gray, op. cit. p. 75 and p. 103.



Virginia and South Carolina south to Alabama and southwest to Arkansas and Texas. The following collections have been seen. VIRGINIA: sandy wooded bottomland of Nottoway River, Courtland, *Fernald & Long* 6672; rich dry woods, Little Neck, *Fernald & Long* 5004; Powhatan Swamp,  $\frac{1}{2}$  mile southwest of Five Forks, *L. F. & F. R. Randolph* 398. NORTH CAROLINA: 5 miles southwest of Durham, *Wiegand & Manning* 2628. SOUTH CAROLINA: without definite locality, *Mellichamp*. INDIANA: 1 mile east of the mouth of White River, *Deam* 32969; in low woods north of Eggwood Pond about 5 miles northwest of Patoka, *Deam* 16925;  $\frac{3}{4}$  mile southeast of Yankee-town, *Deam* 37583. KENTUCKY: without definite locality, *Short*. TENNESSEE: Cedar Barrens of Middle Tennessee, *Gattinger*; near Nashville, *Gattinger* (Curtis, N. Amer. Pl. 188); Knoxville, *Ruth* 175 in part. ALABAMA, Gadsden, *Vasey*. ARKANSAS: without definite locality, *ex hb. Thurber*. LOUISIANA: without definite locality, *Hale*; near Alexandria, *C. R. Ball* 529. TEXAS: Dallas, *Reverchon*; Houston, *Lindheimer*.

Although Walter's description might be applied to more than one species of *Gonolobus*, I am accepting the interpretation of Dr. Gray and others as to its identity, *i. e.* that it, at least in part, is identical with Michaux's *G. macrophyllus*, hence I have taken up the earlier specific epithet. With the more abundant collections at hand Gray's characters distinguishing *G. laevis* Michx. from var. *macrophyllus* Gray show a high degree of variability, hence, I am inclined to regard them as a single entity.

3. *G. CAROLINENSIS* (Jacq.) Schultes, Syst. Veg. vi. 62 (1820); Gray, Proc. Amer. Acad. xii. 76 (1877), Syn. Fl. ed. 1 and ed. 2, 104 (1878 and 1886). *Cynanchum carolinense* Jacq. Coll. ii. 288 (1788), Ic. Pl. Rar. ii. t. 342 (1788). *Vincetoxicum acanthocarpus* Walt. Fl. Carol. 104 (1788). *Gonolobus hirsutus* Michx. Fl. Bor.-Am. i. 119 (1803). *Vincetoxicum carolinense* (Jacq.) Britton, Mem. Torr. Bot. Club, v. 265 (1894). *Odontostephana carolinensis* (Jacq.) Alexander in Small, Man. 1077 (1933).

Delaware south to Georgia (and possibly Florida), west to Tennessee and Alabama. DELAWARE: Middletown, August 16, 1908, *Bartram*; Dover, *Tatnall* 1467. MARYLAND, Middle Neck Road, *Tatnall* 2814; Melwood, *C. P. Smith* 3181; Clinton, *C. P. Smith* 3180. DISTRICT OF COLUMBIA: near Washington, *Holm*, *Vasey*, *Chickering*, *Ward*; Anacostia, *C. P. Smith* 3066. VIRGINIA, dry sandy hickory and oak woods, Burt, *Fernald & Long* 3657; north of Moore's Mill, *Fernald & Long* 3656; northern end of Knott's Island, *Fernald & Long* 4145; rich dry woods, Little Neck, *Fernald & Long* 5003; Great Neck, *Fernald, Griscom & Long* 4693, 5002; Grove, *L. F. & F. R. Randolph* 361; near Williamsburg, *Grimes* 3666, 3690; near Cedar Creek, Frederic County,



*Griscom & Hunnewell 15244*. NORTH CAROLINA: 8 miles north of Chapel Hill, *Wiegand & Manning 2630*; near Statesville, *Gray, Sargent, Redfield & Canby*; Tryon, *Churchill*. SOUTH CAROLINA, Santee Canal, *Ravenel*. GEORGIA, without definite locality, *Biltmore Herbarium 3923<sup>b</sup>*; near Athens, *Perry 1001*. TENNESSEE: slope of Cumberland Plateau, west of Bon Air, *C. A. & U. F. Weatherby*. ALABAMA: without definite locality, *Short*.

I am unable to say whether Jacquin's or Walter's is the earlier specific name. Walter's name seems to have been lost in synonymy and I have accepted the name customarily used. Dr. Gray believed Walter's species and *G. carolinensis* to be identical. Miss Vail found the latter and *G. hirsutus* Michx. were "entirely impossible" to separate with the material which she had at hand. I am inclined to agree with Alexander who accepted *G. hirsutus* and *G. carolinensis* as synonymous but nevertheless separated another entity passing under *Vincetoxicum carolinense*. A glance at plate 494, figs. 3, 5, and 4, 6, shows the difference in the flower-buds, the spread of the corolla, and the retinacula.

4. *G. BALDWINIANUS* Sweet, Hort. Brit. ed. 2, 360 (1830); Gray, Proc. Amer. Acad. xii. 77 (1877) (as *Baldwinianus*), Syn. Fl. ed. 1 and ed. 2, ii<sup>1</sup>. 104 (1878 and 1886). *Vincetoxicum Baldwinianum* (Sweet) Britton, Mem. Torr. Bot. Club, v. 265 (1894). *Odontostephana Baldwiniana* (Sweet) Alexander in Small, Man. 1077 (1933).

Georgia and Alabama west to Missouri and Oklahoma. The following specimens have been examined. ALABAMA: dry woods, *Buckley 10*. MISSOURI: Swan, *Bush 239*; Noel, *Bush 5745*; Cedar Gap, *Lansing 3077*; Eagle Rock, *Bush 230*; near Eagle Rock, along Missouri-Arkansas state line, *Palmer 39460*. Arkansas, Beaver, *Palmer 39473*; Washington County, June 1835, *Engelmann*. Oklahoma, near Page, *Blakeley 1422*; near Idabel, *Houghton 3946*.

This species is readily recognized by the whitish corolla, the subulate lobes of the crown and the very slender retinacula.

5. *G. decipiens* (Alexander) comb. nov. *Odontostephana decipiens* Alexander in Small, Man. 1077 (1933).

This species of "woods and stream-banks, in rather acid soil, Coastal Plain and occasionally adj. provinces, S. C. to Okla., Mo., and Md." according to Alexander, is represented in our herbarium only from Missouri, Arkansas and Louisiana. MISSOURI: St. Louis County, May 31, 1887, *Eggert*; Allenton, June, 1880, *Letterman*; Meramec Highlands, June 25, 1904, *Gleason*; near Pacific, *Greenman 3899*, June 3, 1918, *Churchill*; Pleasant Grove, *Bush 362*; Prosperity, *Bush 2147*; Oronogo, *Palmer 36033*. ARKANSAS, Camden, June 15, 1850, *Fendler*. LOUISIANA: without definite locality, *Hale*.



The best characters of this species are the oblong-conical flower-bud with corolla-lobes strongly contorted, the ascending corolla and the comparatively longer flat teeth of the crown-lobes. In contrast the flower-buds of *G. carolinense* (from which species this has been segregated) are bluntly ovoid, the corolla of the mature flower is rotate (not ascending), the crown-lobes are somewhat variable, but the pollinia are slightly smaller and the retinacula much smaller than in *G. decipiens*.

6. *G. SHORTII* Gray, Bot. Gaz. viii. 191 (1883). *G. obliquus* var. *Shortii* Gray, Syn. Fl. ed. 1, ii<sup>1</sup>. 104 (1878). *Vincetoxicum Shortii* (Gray) Britton, Mem. Torr. Bot. Club, v. 266 (1894). *Odontostephana Shortii* (Gray) Alexander in Small, Man. 1077 (1933).

Range given by Alexander as Georgia to Kentucky and Pennsylvania. Unfortunately in the Gray Herbarium this species is represented only by the two collections cited by Dr. Gray. KENTUCKY, Lexington, *Short*. GEORGIA, near Rome, 1882, *Chapman*.

7. *G. OBLIQUUS* (Jacq.) Schultes, Syst. Veg. vi. 64 (1820); Gray, Proc. Amer. Acad. xii. 76 (1877), Syn. Fl. ed. 1 and ed. 2, ii<sup>1</sup>. 104 (1878 and 1886). *Cynanchum obliquum* Jacq. Coll. i. 148 (1786), Ic. Pl. Rar. ii. t. 341 (1786-93). *Vincetoxicum obliquum* (Jacq.) Britton, Mem. Torr. Bot. Club, v. 266 (1894). *Odontostephana obliqua* (Jacq.) Alexander in Small, Man. 1077 (1933).

Pennsylvania south to Georgia west to Ohio, Indiana, Tennessee and Missouri. PENNSYLVANIA, without definite locality, 1862, *C. E. Smith*; river-banks in Lancaster and Franklin Counties, *Porter*; banks of Susquehanna, Lancaster County, *Porter*. MARYLAND: Bloomington, *J. D. Smith*. DISTRICT OF COLUMBIA: near Washington, *Ward, Holm*. VIRGINIA: near Middletown, *Griscom and Hunnewell 18815*; Peaks of Otter, Bedford County, July 29, 1871, *Curtiss*. NORTH CAROLINA, Hot Springs, Madison County, June 7, 1899, *Churchill*; near Alexander, Buncombe County, *Biltmore Herbarium 3928*. GEORGIA, near Rome, 1882, *Chapman*. INDIANA, along White River, 2 miles above Shoals, *Deam 17181*. TENNESSEE: Knoxville, June and July, 1895, *Ruth*.

Readily distinguished by its many-flowered and very often compound umbels and the linear-ligulate lobes of the corolla.



## II. ON HOUTTUYN'S OVERLOOKED BINOMIALS FOR NATIVE OR INTRODUCED PLANTS IN EASTERN NORTH AMERICA

E. D. MERRILL

(Plate 495)

HOUTTUYN'S<sup>1</sup> "Naturlyke historie," written in Dutch, was frankly an attempt to popularize the binomial system. Christmann and Panzer's<sup>2</sup> "Pflanzensystem," published in German, was to a large degree, although not entirely, a translation of Houttuyn's earlier work, and was illustrated by the same plates, with the interpolation of a few new ones.

Although Houttuyn was the author of over 8800 pages of botanical matter, his work is merely listed in Pritzel's "Thesaurus" under Linnaeus' "Systema naturae," item 5404, as a Dutch edition of Linnaeus' work, without mention of its author's name. What Houttuyn did was to expand the approximately 2350 pages of edition 12 of the "Systema naturae" into 37 volumes containing about 22,000 pages, largely original work, illustrated by 296 distinctly good copper plates. The second part, 14 volumes, somewhat over 8800 pages, with 105 plates, is wholly botanical. Christmann and Panzer fare scarcely better at Pritzel's hands, although their names are mentioned as the authors of the German edition of Linnaeus' "Systema plantarum," item 5431 "nach Anleitung des holländischen *Houttuyn'schen* Werkes übersetzt." This is the only place I have noted in Pritzel's "Thesaurus" where Houttuyn's name is mentioned in connection with this work. This statement applies to the second edition of the "Thesaurus" (1872-77). In the first edition (1751) the entry appears under Houttuyn (item 4730), although in this edition the Christmann and Panzer entry is under Linnaeus' "Systema naturae". One curious phase of the situation is that in the entire 37 volumes of

<sup>1</sup> HOUTTUYN, M. *Naturlyke historie of uitvorige beschryving der dieren, planten en mineraalen, volgens het samenstel van den heer Linnaeus. Met naauwkeurige afbeeldingen.* Eerste deels i. (1761)—xviii. (1773); Tweede deels i. (1773)—xiv. (1783); Derde deels i. (1781)—v. (1785). The 18 volumes of the "Eerste deels" consider the animals, the 14 volumes of the "Tweede deels" the plants, and the 5 volumes of the "Derde deels" the minerals.

<sup>2</sup> CHRISTMANN, D. and PANZER, G. W. F. *Des Ritters Carl von Linné Königlichen Schwedischen Leibarztes &c. vollständiges Pflanzensystem nach der dreyzehnten lateinischen Ausgabe und nach Anleitung des holländischen Houttuynischen Werks übersetzt und mit einer ausführlichen Erklärung ausgefertigt.* i. (1777)—xiv. (1788). The first seven volumes are by Christmann, the last seven by Panzer; see xiii. pt. ii, Vorbericht [2]. (1787).



TAB. X



PEDICULARIS LABRADORICA Wirsing.

Reproduction of plate 10, Wirsing's "Eclogicae botanicae" (1778). This figure was also reproduced by Panzer, Pflanzensyst. viii. t. 57C (1782).



Houttuyn's work his name does not appear on the title page of a single volume, and I have detected it in only six places where it is appended to introductory matter. As to Christmann and Panzer there is no evidence of authorship of their 14 volume work until the second part of volume 13 appeared in 1787, ten years after publication commenced. In the preface, which is signed by Panzer, is a statement that Christmann was the author of the first seven volumes and that Panzer was the author of the last seven. Manifestly the several authors involved were not seeking for publication credit!

While some of Houttuyn's new species were accepted by his contemporaries and immediate successors, it has become increasingly evident that a very considerable number of his new names have been entirely overlooked, and the same statement applies to the fewer new names published by Christmann and Panzer. Two or three generic names and at least 100 binomials, validly published by these authors between the years 1773 and 1788, do not appear in any indices or nomenclators that have been issued since the works under discussion were published.

In spite of the relatively early dates of these extensive, well illustrated, but now little known and less consulted works, few changes in accepted nomenclature are involved. Most of them appertain to species of Asia and Malaysia, and particularly to those of South Africa. In collating the two works and in checking the binomials with those used in standard works of a similar nature, I have noted four cases where the currently accepted binomials for two native and two introduced species in the eastern United States must be replaced by earlier, and for the most part overlooked, binomials. For another introduced species, *Polygonum cuspidatum* Sieb. & Zucc., for those who prefer to recognize smaller generic units, attention is called to the fact that *Renoutria* Houtt. (1777) replaces *Pleuropterus* Turcz. (1848). The task of collating the two works was not a simple one, for Houttuyn did not consistently indicate his new genera and new species as such; and Christmann and Panzer, who published various new names, did not indicate such names as new.

It seems desirable to publish the following notes on the American species for the benefit of those botanists interested in problems of nomenclature appertaining to eastern North American plants. No new binomials are involved, but merely replacements of four currently accepted names by earlier ones. There are a few other overlooked



binomials for American species in the two works under discussion, but in no case do they affect nomenclature, all of them falling as synonyms of previously described species. Among these are the following: *Anagallis flava* Houtt. Nat. Hist. II. vii. 514 (1777) = *Lysimachia quadrifolia* Linn.; *Cardamine virginiana* Panzer, Pflanzensyst. viii. 282 (1782) = *Arabis virginica* (Linn.) Trelease; *Eriophorum virginianum* Houtt. Nat. Hist. II. xiii. 127 (1782) = *E. virginicum* Linn.; *Helianthus dodecapetalus* Panzer, Pflanzensyst. ix. 557 (1783) = *H. decapetalus* Linn.; *Helleborus trifolius* Houtt. Nat. Hist. II. ix. 262 (1778) = *Coptis trifolia* (Linn.) Salisb.; *Medeola virginiana* Houtt. Nat. Hist. II. viii. 416 (1777) = *M. virginica* Linn.; *Osmunda virginica* Panzer, Pflanzensyst. xiii. pt. i, 57 (1786) = *Botrychium virginianum* (Linn.) Sw.; and *Panax trifoliatum* Panzer, Pflanzensyst. x. 335 (1783) = *Panax trifolium* Linn. It is planned to publish a general consideration of all the new binomials published by Houttuyn and by Christmann and Panzer at a later date.

#### POLYGONACEAE

*Polygonum cuspidatum* Sieb. & Zucc. Abh. Akad. Muench. iv. pt. ii, 208 (1846) (Fl. Jap. Fam. Nat. ii. 84); Nakai, Fl. Korea. ii. 173 (1911). *Renoutria japonica* Houtt. Nat. Hist. II. viii. 640, t. 51, f. 1 (1777); Christm. Pflanzensyst. vi. 628, t. 51, f. 1 (1780); Ohki, Bot. Mag. Tokyo xl. 49 (1926); Danser, Bull. Jard. Bot. Buitenz. sér. III. viii. 26 (1926), non *Polygonum japonicum* Meisn. *Polygonum pictum* Sieb. Jaarb. Nederl. Maatsch. Aaanm. Tuinb. 44 (1848), nomen nudum. *Polygonum Sieboldii* Reinw. ex De Vriese, op. cit. 31. 1850, in syn.; L. H. Bailey, Cycl. Am. Hort. iii. 1393. f. 1880 (1901). *Polygonum Zuccarinii* Small, Mem. Dept. Bot. Columbia Univ. i. 158. t. 66 (1895). *Polygonum Renoutria* Makino, Bot. Mag. Tokyo xv. 84 (1901), Somuku-Dzusesu, ed. 3, i. 75. t. 75 (1910). *Pleuropterus Zuccarinii* Small in Britt. & Br. Ill. Fl. North. U. S. ed. 2, i. 676, f. 1655 (1913). *Pleuropterus cuspidatus* H. Gross in Loesen. Beih. Bot. Centralbl. xxxvii. pt. ii, 114 (1919). *Pleuropterus cuspidatus* Moldenke, Torreya xxxiv. 7. 1933.

This was described by Houttuyn as the type of a new genus, *Renoutria*, listed in "Index Kewensis" as a genus of uncertain status, but not included in Bentham and Hooker's "Genera Plantarum" nor in Engler and Prantl's "Die Natürlichen Pflanzenfamilien." Nevertheless, if one wishes to recognize generic segregates in this group, *Renoutria* Houtt. (1777) will replace *Pleuropterus* Turcz. (1848). In 1901 Makino recognized *Renoutria japonica* Houtt. as being identical with the very common *Polygonum cuspidatum* Sieb. & Zucc., and



in 1926 Danser reproduced Houttuyn's original description and illustration. Since 1895 the species has acquired at least four bibliographic synonyms, although under the present rules Siebold and Zuccarini's specific name is valid in *Polygonum*. The "earlier" *P. cuspidatum* Willd. appears only in synonymy, and is hence not valid. These synonyms are *Polygonum Zuccarinii* Small (1895), *Polygonum Renoutria* Makino (1901), *Pleuropterus Zuccarinii* Small (1913), *Pleuropterus cuspidatus* H. Gross (1919), and *Pleuropterus cuspidatus* Moldenke (1933). For those who recognize small genera in this group the binomial should be *Renoutria japonica* Houtt. Should *Pleuropterus* Turcz. (1848) be ultimately conserved over *Renoutria* Houtt., for which no valid reason exists, then a new combination based on *Renoutria japonica* Houtt. will be necessary. Those who recognize *Polygonum*, *sensu latiore*, should use the binomial *P. cuspidatum* Sieb. & Zucc. For notes on the validity of the latter name, under *Polygonum*, see Moldenke, l. c., and Rehder, Jour. Arnold Arb. xvii. 316 (1936). The species is a very common and widely distributed one in eastern Asia and in Japan, and is naturalized in various parts of the eastern United States.

#### UMBELLIFERAE

*TORILIS JAPONICUS* (Houtt.) DC. Prodr. iv. 219 (1830); Buwalda, Blumea ii. 169 (1937). *Caucalis japonicus* Houtt. Nat. Hist. II. viii. 42, t. 45, f. 1 (1777); Christm. Pflanzensyst. vi. 45, t. 45, f. 1 (1780). *Tordylium Anthriscus* Linn. Sp. Pl. 240 (1753). *Caucalis Anthriscus* Huds. Fl. Angl. 99 (1762), ed. 2, 114 (1778), Britt. & Br. Ill. Fl. North. U. S. ii. 54, f. 2634 (1897). *Torilis Anthriscus* Gmel. Fl. Bad. i. 613 (1805); Britt. & Br. Ill. Fl. North. U. S., ed. 2, 2: 626, f. 3106 (1913); Thellung in Hegi, Ill. Fl. Mittel-Eur. v. pt. ii. 1051. 1926, non Gaertn. (1788), nec Bernh. (1800).

Linnaeus described two similar but distinct species with the same specific name, *Tordylium Anthriscus* and *Scandix Anthriscus*. The *Tordylium* is the species here considered but the specific name is invalidated in *Torilis* by both Gaertner's and Bernhardt's use of the same epithet for a different species based on *Scandix Anthriscus*. *Scandix Anthriscus* Linn. has nothing to do with the species here considered, and is *Chaerifolium Anthriscus* (Linn.) Schinz & Thellung (*Torilis Anthriscus* Gaertn.; Bernh.). Under the International Code Houttuyn's specific name is the correct one for this very common and widely distributed Eurasian weed which occurs as an introduced and naturalized species in various parts of North America. There is a



specimen in the Delessert herbarium at Geneva, Switzerland, accredited in literature to Houttuyn; it may prove to be a Royen specimen, *i. e.* one from Royen's herbarium and named by him rather than by Houttuyn.

#### LABIATAE

*TRICHOSTEMA SETACEUM* Houtt. Nat. Hist. II. ix. 428 (1778). *Trichostema lineare* Walt. Fl. Carol. 164 (1788). *Trichostema lineare* Nutt. Gen. ii. 39 (1818); Britt. & Br. Ill. Fl. North. U. S. iii. 78, f. 3074 (1898), ed. 2, iii. 105, f. 3574 (1913). *Trichostema foliis setaceis* Gronov. Fl. Virgin. ed. 2, 90 (1762).

Houttuyn's hitherto overlooked binomial was based wholly on the Gronovius reference, which in turn was based on *Clayton 41* from Virginia. Mr. J. E. Dandy of the British Museum (Natural History) kindly examined Clayton's specimen at my request. He reports that the rather fragmentary material, of which a photograph was courteously supplied to me by Dr. J. Ramsbottom, was determined by Mr. C. A. Weatherby in 1935 to represent *Trichostema lineare* Nutt. Professor Fernald calls my attention to the fact that *Trichostema lineare* Nutt. was originally and correctly published by Walter as *T. lineare* Walt. thirty years before Nuttall independently described the same species under the same specific name. Houttuyn did not indicate his binomial as a new one, yet it antedates *T. lineare* Walt. by ten years. Christmann and Panzer did not recognize the species. *Trichostema setaceum* Houtt. occurs in dry sandy soil, pine barrens, etc. from Connecticut to Georgia and Alabama, mostly near the coast.

#### SCROPHULARIACEAE

*PEDICULARIS LABRADORICA* Wirsing, Ecolog. Bot. [2] t. 10 (1778); Panzer, Pflanzensyst. viii. 39, t. 57c (1782); Fernald, RHODORA xxxiii. 193 (1931). *Pedicularis euphrasioides* Stephan in Willd. Sp. Pl. iii. 204 (1801); Britt. & Br. Ill. Fl. North. U. S. iii. 185, f. 3332 (1898), ed. 2, iii. 220, f. 3847 (1913). PLATE 495.

This species was not included by Houttuyn in his treatment of *Pedicularis*, Nat. Hist. II. ix. 468-478 (1778). The "Index Kewensis" reference "[Panzer, in] Houtt. Pflanzensyst. viii. 39 = *euphrasioides*." is erroneous and incomplete. Fernald, in calling attention to the older name for *Pedicularis euphrasioides* Stephan, gives the reference as "Houttuyn, Pflanzensyst." This error in citation originated with Willdenow who gives it as "Houttuyn Lin. Pfl. Syst. 8. p. 39. t. 57c." Panzer, in his translation of Houttuyn's work, added a description of this species, and interpolated two extra plates which he numbered



57b and 57c; the second of these is an excellent illustration of the species under consideration (see PL. 495), copied from "Ecl. bot." which he cites without giving the author of the work. This proves to be Wirsing's "Eclogicae botanicae" (1778), as verified by an examination of this work first by Mr. J. E. Dandy in the library of the British Museum, Natural History, and checked by me in the library of the New York Botanical Garden. Wirsing's hitherto overlooked description of *Pedicularis labradorica* is as follows:

"Caule ramoso, calycibus ore obliquo integro emarginato. Addimus hanc plantam, antea neque descriptam neque depictam, sed plane novam, quam e Labradoria accepimus. Color corollae flavus est. Accedit ad *Pedicularum caule ramoso, calycibus oblongis quinquefidis crenatis, floribus laxè spicatis*. Gmelin, *Fl. sibir. tom. 4. p. 203. t. 43.* sed pluribus notis ab ea differt."

This is the only species that Wirsing characterized as new in the work cited. It has been overlooked by all subsequent authors, or erroneously accredited to Houttuyn, who never considered the species. It occurs from Greenland and Labrador, through arctic America to British Columbia and Alaska, and also in northern Asia.

#### COMPOSITAE

EUPATORIUM RUGOSUM Houtt. Nat. Hist. II. x. 558 (1779). *Ageratum altissimum* Linn. Sp. Pl. 839 (1753), ed. 2, 1176 (1763). *Eupatorium urticaefolium* Reichard, Syst. Pl. iii. 719 (1780); Panzer, Pflanzensyst. ix. 245 (1783); Britt. & Br. Ill. Fl. North. U. S. ed. 2, iii. 361, f. 4169 (1913). *Eupatorium ageratoides* Linn. f. Suppl. 355 (1781); Britt. & Br. Ill. Fl. North. U. S. iii. 312, f. 3629 (1898). *Eupatorium altissimum* Murr. Syst. Veg. ed. 13, 614 (1774), non *E. altissimum* Linn. (1753).

*Eupatorium rugosum* Houtt. is a validly published new name based on *Ageratum altissimum* Linn.; it was not indicated by Houttuyn as new. The Linnaean binomial and the pre-Linnaean synonyms of Gronovius and Cornut are cited in the footnote. *Eupatorium ageratoides* Linn. f. (1781) was based on *Eupatorium altissimum* Murr. (1774), which in turn was based on *Ageratum altissimum* Linn. *Eupatorium urticaefolium* Reichard (1780) was also proposed as a new name for the same Linnaean species. Houttuyn in 1779, Reichard in 1780, and Linnaeus f. in 1781 all proposed new names, one year apart, for *Eupatorium altissimum* (Linn.) Murr., which was invalidated by the earlier *E. altissimum* Linn. (1753). The species occurs from Quebec westward to Nebraska and southward to Louisiana and Florida. *Eupatorium rugosum* HBK., an Ecuadorian species, needs a new name.



## III. SMELOWSKIA AND POLYCTENIUM

REED C. ROLLINS<sup>1</sup>

(Plate 496)

To students of the *Cruciferae* the accurate definition of genera is an acute problem. This is understandable when the uniformity of flower- and fruit-morphology is considered together with the apparent youth of the family. While this "naturalness" has become an enigma to those chiefly interested in developing a suitable classification, the same characteristic presents a fertile field of investigation for the phylogenist, since the differences between genera are sometimes relatively small and it is often possible to trace evolutionary trends within the family with considerable facility. However, an adequate and accurate system of nomenclature based upon all the available evidence must be built up before finality in a phylogenetic scheme for the family can be developed. Accordingly a program of research is under way which is designed to clarify the generic relationships of certain groups in the *Cruciferae* which occur in North America.

In addition to the usual methods in systematic botany a certain amount of micro-technique has been employed in the present study. Serial sections of flowers and fruits of *Smelowskia* and *Polyctenium* have been prepared for detailed examination. Since fresh material was not available, flowers and fruits from herbarium material were swelled to normal by leaving them over-night in a 5% solution of KOH. The tissues of the material were then softened by a 12-hour treatment with a ten percent solution of hydrofluoric acid. From this point the ordinary paraffin method of embedding and sectioning was employed. The sections were stained with safranin and fast green.

Probably the most useful and significant microscopical observations in a study of this nature are those which accurately establish the relative position of parts and organs. Thus it has been possible to show (PLATE 496, FIG. 14) that the long stamens in the flower of *Smelowskia* are proximal to the transverse long axis of the ovary, whereas the lateral short stamens are proximal to a line running across the short axis. In *Polyctenium* (PLATE 496, FIG. 2) the compression of the normal mature silique is the opposite. The long stamens are proximal to a median transverse line through the short axis of the silique and the short stamens are near a transverse line passed through

<sup>1</sup> The Society of Fellows of Harvard University.



the long axis. Thus the compression of the silique is contrary to the septum in *Polyctenium* and parallel to it in *Smelowskia*. Serial sections of young and old flowers show these differences to be constant for the two genera, and, although it might be argued that a change from one type of orientation to the other is relatively simple, yet such an accomplished change is highly important when considered together with correlated changes which accompany it. *Smelowskia* and *Polyctenium* are clearly related genera, though there is little evidence to indicate that their entire history has been similar. *Smelowskia* is essentially an arctic-alpine genus with two areas of concentration, the Cascade and Rocky Mountains of western North America and the Altai and adjacent ranges of Siberia and the Turkestans. The genus extends as far south as Mt. Lassen in the Sierra Nevada of California and to southern Colorado in the Rocky Mountains. *Polyctenium*, on the other hand, inhabits a unified semiarid area at relatively low elevations in northeastern California, southern and eastern Oregon and western Idaho. Further evidence of the distinctness of these two genera may be found in the number of ovules, length of funiculus, size of seed, petal-shape, type of foliage and general habit of growth. The leaves of *Smelowskia* are petiolate, pliable and usually covered with a dense whitish tomentum; the plants are caespitose, with the caudices covered by leaf bases; the petals differentiated into claw and rounded blade; the funiculus short (less than 1 mm.) and stubby; the ovules 2–10, maturing to relatively large seeds (2 mm. long). *Polyctenium*, on the other hand, has non-petiolate, highly dissected, wiry leaves with linear segments; sparse, never whitish, pubescence; caudices free of leaf-bases; and truncate petals which taper from apex to base. A weak funiculus 1 mm. long attaches the small (1 mm. long) seed to the replum and 12–28 ovules are present in the silique.

In 1875 Watson<sup>1</sup> described a plant from southern Oregon as *Smelowskia* ? *Fremontii*. Appended to the description he says "it much resembles *S. calycina* in habit, but the characters of the fruit do not fully accord with those of the genus." It is significant, in light of subsequent treatments and as confirmatory evidence for the present study, that he considered the plants to be somewhat anomalous in *Smelowskia*. Though Robinson (Syn. Fl.) admitted this species to *Smelowskia* without qualification, Greene,<sup>2</sup> upon encountering the

<sup>1</sup> Watson, Proc. Am. Acad. Arts & Sci. ii. 123 (1875).

<sup>2</sup> Greene, Erythea iii. 69 (1895).



same biological unit, described it as a new species of *Braya* to which genus it is not particularly related. He later recognized his own plants to be conspecific with those of Watson, but refused even then to admit them to the genus *Smelowskia*. In describing *Polyctenium* as a new genus, Greene<sup>1</sup> said in part, "to the eye of experience there is not a suggestion here of the genus *Smelowskia*, which are not only soft-wooly herbs, but their herbage is soft as to texture, that is, it is yielding or pliable, whereas in *Polyctenium* it is in every part rigid, wiry as to the stems and as to the leaves stiffly acerose." Thus with a strong emphasis on habital and vegetative characteristics but without a thorough examination of the morphology of flower and fruit, the genus *Polyctenium* was created; at the same time two new species were described and attributed to it. The superficiality of Greene's observations does not alter the fact that he was correct in separating these two genera. Subsequent treatments of *Smelowskia* have included *Polyctenium* as a synonym, though O. E. Schulz<sup>2</sup> gave it the rank of a section. In view of this lack of uniformity of treatment and clear elucidation of the facts involved, the objects of the present study were: (1) to determine the facts of floral morphology, (2) to use these criteria to establish the two units as a single genus or as two genera, as the facts dictated, and (3) to present a systematic treatment of this group for North America.

It is a pleasure to acknowledge my indebtedness to Professor M. L. Fernald, Director, and other members of the staff of the Gray Herbarium, where facilities for study have been made readily available and constantly at my disposal. That portion of the work which involved micro-technique was done in the laboratory of Professor R. H. Wetmore. An expression of appreciation is made to the curators of the following herbaria, who have generously loaned specimens or allowed me the privilege of examining material in their care: University of California (C); Missouri Botanical Garden (M); University of Notre Dame (ND); New York Botanical Garden (NY); Rocky Mountain Herbarium (RM); United States National Herbarium (US); University of Washington (UW). Specimens cited (G) or not otherwise designated are in the Gray Herbarium of Harvard University. Collections from my own herbarium are designated (R).

<sup>1</sup> Greene, Leaflet ii. 219 (1912).

<sup>2</sup> O. E. Schulz in Engler, *Pflanzenr.* iv<sup>105</sup>. 358 (1924).



## SYNOPSIS OF SMELOWSKIA IN NORTH AMERICA

- a. Mature fruits oblong, tapering at both ends, 5–12 mm. long; seeds 4–10; basal leaf-bases strongly ciliate with long acicular hairs; lobes of basal leaves oblong or cuneate, rarely dissected to mid-rib; stems simple. . . . . *S. calycina* & vars.
- b. Cauline leaves entire or trilobate at apex; basal leaves entire or remotely toothed, less than 2.5 cm. long; inflorescence lax-corymbose; plants of Alaska and Siberia adjacent to the Bering Strait. . . . . var. *integrifolia*.
- b. Cauline leaves pinnatifid; basal leaves pinnately dissected or tending to become entire, more than 2.5 cm. long; inflorescence congested-corymbose. . . . . var. *typica*.
- a. Mature fruits ovate to slightly oblong, truncate at base, 3–6 mm. long; seeds 2–6; basal leaf-bases lacking pronounced ciliation; lobes of basal leaves ovate and dissected to mid-rib, stems often branched. . . . . *S. ovalis* & vars.
- c. Plants densely caespitose, clothed in long simple hairs; fruits 4–6 mm. long; plants of northern California. . . . . var. *congesta*.
- c. Plants less dense; leaf-blades with a short, often branched pubescence; fruits 2–4 mm. long. . . . . var. *typica*.

*S. CALYCINA* (Stephan) C. A. Meyer. Perennial, caespitose, the multiple caudex clothed with old leaf-bases; stems several to numerous, simple, pubescent with short branched and long simple hairs, 5–15 cm. long; basal leaves numerous, petiolate, pinnately divided or very rarely almost entire, segments oblong to cuneate, densely clothed with a whitish, chiefly branched, pubescence, bases strongly ciliate with long white acicular hairs; cauline leaves similar but nearly sessile, few, the lobes more linear, tending to be reduced upwards on the stem, 1–3 cm. long; pedicels ascending, pubescent with long simple hairs, 5–10 mm. long; sepals pubescent, oblong, 2.5–3.5 mm. long, 1–1.5 mm. wide; petals white, rounded at apex, differentiated into claw and blade, 5–7 mm. long, 3–4 mm. wide; pods linear to oblong, tapering at both ends, glabrous or rarely pubescent with simple hairs, slightly flattened parallel to septum or nearly terete, 5–12 mm. long, 1.5–2.5 mm. wide, style 1.5 mm. or less, valves nerved from base to apex, stigma expanded; seeds few (4–10), marginless, 2 mm. long, funiculus short and stout, cotyledons incumbent.

Var. **typica**. *S. calycina* C. A. Meyer in Ledeb. Fl. Alt. iii. 170 (1831); Gray, Proc. Acad. Nat. Sci. Phila. no. 43: 58 (1863); Watson, U. S. Geol. Expl. (fortieth parallel) v. 24 (1871); Parry in Hayden, U. S. Geol. Surv. Wyo. 484. (1871); Porter & Coulter, Syn. Fl. Colo. 8 (1874); Macoun, Catal. Canad. Pl. i. pt. 1: 56. 490 (1883); Coulter, Man. Bot. Rky. Mt. Reg. 24 (1885); Tweedy, Fl. Yellowst. Nat. Park 28 (1886); Macoun, Check-List Canad. Pl. 10. (1889); Nelson, Bull. Wyo. Exp. Sta. 28: 83 (1896); Howell, Fl. Northw. Am. i. 57 (1897) in part; Rydb. Mem. N. Y. Bot. Gard. i. 183 (1900); Piper, Contrib. U. S. Nat. Herb. xi. 300 (1906); Brown, Alp. Fl. Canad. Rky. Mts. 121 (1907) t. xxxi; Frye & Rigg, Northw. Fl. 189 (1912); Clements & Clements, Rky. Mt. Flowers, 27 (1914); G. N. Jones, Univ. Wash. Publ. Biol. v. 161 (1936), including *S. ovalis*. *S. calycina* prol.



*americana* O. E. Schulz in Engler, Pflanzenr. iv<sup>105</sup>. 356. (1924) & Pflanzenf. xviiib. 656 (1936). *Lepidium calycinum* Stephan in Willd. Spec. Pl. iii<sup>1</sup>. 433 (1801). *Hutchinsia calycina* Desv. Journ. Bot. iii. 4. 168 (1814); DC. Syst. ii. 388 (1821) & Prodr. i. 178 (1824); Hook. Fl. Bor.-Am. i. 58 (1830) t. xvii. fig. B; T. & G. Fl. North Am. i<sup>1</sup>. 114 (1838); Ledeb. Fl. Ross. i. 200 (1842). *H. calycina*  $\beta$  *americana* Regel & Herder, Bull. Soc. Nat. Mosc. xxxix<sup>2</sup>. 101 (1866) excl. pl. Alaska & Oreg. *S. americana* Rydb. Bull. Torr. Bot. Club xxix. 239 (1902); Blankinship, Mont. Agric. Col. Sci. Studies i. 2. 60 (1905); Rydb. Fl. Colo. 153 (1906); Coulter & Nelson, New Man. Bot. Centr. Rky. Mts. 224 (1909); Rydb. Fl. Rky. Mts. 329 (1917); Henry, Fl. So. Br. Columb. 142 (1918); Standley, Contrib. U. S. Nat. Herb. xxii<sup>5</sup>. 346 (1921); Tidestrom, Contrib. U. S. Nat. Herb. xxv. 239 (1925); Standley, Pl. Glac. Nat. Park, 45 (1927), fig. 58. *S. lineariloba* Rydb. Bull. Torr. Bot. Club, xxxi. 555 (1904) and Fl. Colo. 153 (1906); Cockerell, Am. Nat. xl. n. 480: 865 (1906); Rydb. Fl. Rky. Mts. 329 (1917); Holm, Mem. Nat. Acad. Sci. Wash. xix. 9 (1923); Schulz, l. c. 357 and Das Pflanzenf. xviiib. 656 (1936); Graham, Ann. Carneg. Mus. xxvi. 222 (1937). *S. lineariloba* f. *virescens* Schulz l. c. *S. lobata* Rydb. Bull. Torr. Bot. Club xxxix. 327 (1912); Rydb. Fl. Rky. Mts. 329 (1917).—Southern Colorado and Utah to Washington, British Columbia and Alberta and in the Altai region of south-central Siberia. CANADA: locality uncertain, Palliser's Brit. N. Am. Exp., Rocky Mts. 1858, *E. Bourgeau* (NY, G, type & isotype of *S. lobata* Rydb.). ALBERTA: Sheep Mt., July 1895, *Macoun* 10315; Elbow River, June–Jul. 1897, *Macoun* 18172; Crow Nest, lat. 49° 30', Aug. 1897, *Macoun* (ND); north of Kootenai Pass, July 1883, *Dawson*. BRITISH COLUMBIA: Skagit Valley, July 1905, *Macoun* 70847; 40–50 miles sw. of Banff, Jul.–Aug. 1905, *B. P. Clark*. UNITED STATES: exact locality unknown; Rky. Mts. lat. 49° n. 1861, *Lyall*; sw. Calif. to so. Utah, May–Oct. 1898, *C. A. Purpus* (C). MONTANA: Upper Marias Pass, Aug. 1883, *Canby* 32; Bald Mt. July 1880, *S. Watson* 36; McDonald's Peak, July 1883, *Canby* 32; Spanish Peaks, July 1901, *J. Vogel*; Glacier Park, Gunsight Mt., Aug. 1919, *Somes* 31 (NY); Glacier Park, Baring Basin, July 25, 1933, *McLaughlin* 2904 (UW). WYOMING: Saltlick Mt., ne. of Kendall, Aug. 1922, *E. B. & L. B. Payson* 2952 (G, RM); the Thunderer, Yellowstone Nat. Park, July 1899, *A. & E. Nelson* 5821 (G, RM); Teton Pass Mts., July 1920, *E. B. & L. B. Payson* 2095 (G, RM); Wind River Mts., July 1922, *E. B. & L. B. Payson* 2890 (G, RM); Red Mt. ne. of Smoot, July 1923, *Payson & Armstrong* 3629 (G, RM); nw. Wyo. 1873, *Parry* 17; Laramie, July 1891, *Nelson* 5; Frozen Lake, Park Co., July 1937, *L. O. & R. P. Williams* 3584 (R). COLORADO: Rky. Mts. lat. 39°–41°, 1862, *Hall & Harbour*; near Trout Lake, San Miguel Co., Aug. 1924, *E. B. & L. B. Payson* 4181 (G, RM); Ethel Peak, Larimer Co., Aug. 1903, *Goodding* 1888 (G, RM); Mt. nw. of Como, July 1895, *Crandall & Cowan* 66; La Plata Mts., July 1898, *Baker, Earle & Tracy* 580 (G, isotype of *S. lineariloba* f. *virescens* O. E.



Schulz); Douglass Mt., 1878, *M. E. Jones* 447 (NY, type of *S. lineariloba* Rydb.); Hamilton Pass, Aug. 1875, *E. L. Greene* 671. IDAHO: Smoky Mts., Blaine Co., Aug. 1916, *Macbride & Payson* 2733 (G, RM); south end Soldier Mts., June 1916, *Macbride & Payson* 2889 (G, NY, RM); Mt. Hyndman, July 30, 1936, *Thompson* 13,631; Henry Lake, Fremont Co., July 1920, *E. B. & L. B. Payson* 1958 (G, RM); Stevens Peak, Aug. 1895, *Leiberg* 1480. UTAH: Ridge nw. Paradise Park, Uinta Basin, July 1933, *Graham* 8433; Big Cottonwood Canyon, Salt Lake Co., June 1905, *Garett* 1301; July 1905, *Rydberg* 6821; American Fork Canyon, July 1885, *Leonard*; Uinta Mts., Aug. 1869, *S. Watson* 100; July 1926, *E. B. & L. B. Payson* 4916 (G, RM); La Sal Mts., July 1924, *E. B. & L. B. Payson* 3982 (G, RM). NEVADA: East Humboldt Mts., Aug. 1868, *S. Watson* 100; Sept. 1868, *S. Watson* 100. OREGON: Wallowa Mts., Aug. 1886, *Cusick* 1347 (C, G). WASHINGTON: Mt. Stuart, Aug. 1883, *T. S. Brandegee* 641; July 1931, *Thompson* 7679; Olympic Mts. Jefferson Co., Aug. 1931, *Thompson* 8002; Mt. Angeles, Clallam Co., July and Aug. 1931, *G. N. Jones* 3171 and 3799 (UW); June 1932, *Thompson* 8389; July 1931, *Thompson* 7386 and 7394; Hurricane Ridge, June 1934, *Thompson* 10591 (G, UW); Sept. 6, 1937, *Thompson* 14,214 (R); Olympic Mts., 1889, *J. M. Grant*.

Ever since Rydberg<sup>1</sup> published *S. americana* after having made the following observation, "while in Europe last summer, I looked up the Asiatic type of *S. calycina* and this differs considerably from ours in the long villous pubescence," many botanists have hesitated to associate the plants of North America specifically with those of Siberia. The fact that the author neither amplified nor elucidated his statement, leaves much to be desired, since anyone familiar with our plants knows that the pubescence of the upper stem, pedicels and sepals is of a "long villous" type. This point, insignificant at the outset, is of no value in separating the plants from the two areas. My studies on this problem have revealed two very minor quantitative differences, both of which are covered by the natural variation in American plants and would likely lose even the slight conspicuousness here recorded, if a larger series of Asiatic specimens were considered. The average length of the style is a fraction of a millimeter longer and the pod averages 1-2 mm. shorter in the Siberian plants than in those from this country. However, on the whole, plants from the two continents are so similar in all important morphological features that they cannot be satisfactorily maintained as even varietally distinct.

Several variations of minor importance, as illustrated by a large series of specimens, may well be noted with profit. Plants from the

<sup>1</sup> Rydberg, Bull. Torr. Bot. Club xxxix. 239 (1902).



Olympic Mountains of Washington and from northern Montana extending northward tend to be whitish from a very dense pubescence. That this is probably a climatological response is indicated by the fact that a gradual reduction in the amount of indument may be observed on specimens from localities proceeding from north to south along the Rocky Mountain axis. Rydberg gave weight to the abundance of vestiture in describing *S. lobata*, while O. E. Schulz described *S. lineariloba* f. *virescens* largely on the basis of a reduced amount of pubescence. Neither of these forms seem to merit nomenclatorial rank, however, since the distinguishing characters attributed to them are either unstable or of very minor significance. The fruits vary in length as does the length of the style. For example, the short pods (5–6 mm.) and styles (less than 1 mm.) found on the type-specimen of *S. lobata* from British North America, are also found on specimens from Wyoming (*Payson & Payson* 2952) and much farther south in Utah (*Payson & Payson* 3982) neither of which exhibit the supposedly distinctive correlated characters. Leaf-shape and degree of lobation are highly variable, lacking correlation with stable features and occurring at various geographical points throughout the range of the species. Thus it seems clear that *S. lineariloba*, founded chiefly on length of pod and leaf-lobation, *S. lineariloba* forma *virescens*, founded on scantiness of pubescence, and *S. lobata*, founded largely on abundance of vestiture, leaf-lobation and length of silique and style, should be included under the variable but understandable *S. calycina*.

Var. **integrifolia** (Seemann), comb. nov. Leaves entire or divided toward apex only, spatulate to somewhat cuneate, petiolate, 1–2.5 cm. long, 2–7 mm. wide; stems 5–12 cm. long; inflorescence lax-corymbose; pedicels 5–10 mm. long, spreading; siliques ellipsoidal, narrowed toward base, glabrous, valves nerved; style less than 1 mm. long; seeds oblong, 2 mm. long, 1 mm. broad, 2–4 in each silique.—*Hutchinsia calycina* var. *integrifolia* Seemann, Bot. Voy. Herald 25 (1852). *H. calycina* var.  $\beta$ , Hook. Fl. Bor.-Am. i. 59 (1830); Hook. & Arnott, Bot. Beechey's Voy. 122 (1832); T. & G. Fl. No. Am. i. 114 (1838). *H. calycina* var.  $\gamma$ , Ledeb. Fl. Ross. i. 201 (1842). *Smelowskia calycina* Robinson in Gray, Syn. Fl. No. Am. i. 136 (1895) in part. *S. calycina* prol. *americana* f. *integrifolia* O. E. Schulz in Engler, Pflanzenr. iv<sup>105</sup>. 356 (1924).—Western coast of Alaska and eastern coast of Siberia (?) adjacent to Bering Strait. ALASKA: Port Clarence, July 1899, *Trelease & Saunders* 3986 (M); Anvil Peak near Nome, July 1936, *G. N. Jones* 9094; July 8 and Aug. 16, 1900, *Flett* 1631 (UW). SIBERIA: Plover Bay, 1881, *John Muir* 228 (G, this fragmentary specimen not certainly determinable as var. *integrifolia* but presumably belonging here).



First described as var.  $\beta$  under *Hutchinsia calycina* by Hooker, this entity, originally collected on Cape Mulgrave by Lay & Collie, has received a variety of unsatisfactory treatments. Torrey & Gray and Ledebour followed Hooker in separating the unit as a variety with entire leaves but failed to give it a name. Seemann, in enumerating his collections from Alaska, designated a plant from Cape Kruzenstern as var. *integrifolia*, citing Hooker's description of var.  $\beta$  and erroneously ascribing the name to him. O. E. Schulz correctly cited Seemann as the author of the name when relegating this unit to the status of a form; but, not having seen specimens, he apparently regarded the characters repeatedly emphasized by earlier workers as of only minor importance. Mature fruiting specimens show characters which well merit the rank of variety for this entity.

**S. ovalis** M. E. Jones. Perennial, multiple caudex clothed with dead leaf-bases; stems simple or often branched, densely pubescent with a long simple and short branched pubescence, 5–15 cm. long; basal leaves petiolate, pinnately divided, segments obovate, densely clothed with a whitish chiefly branched pubescence, 2–6 cm. long; cauline similar, few, 1–3 cm. long; inflorescence corymbose, elongating but dense in fruit; pedicels ascending, densely pubescent with long simple hairs, 4–8 mm. long; sepals oblong, scarious-margined, hairy, 3–3.5 mm. long, 1–1.5 mm. wide; petals white, rounded at apex, differentiated into claw and blade, 4–5 mm. long, 2 mm. wide; pod glabrous, ovoid to ovate, 4–6 mm. long, 4 mm. broad, valves faintly nerved at base; style less than 1 mm. long; stigma expanded; seeds few (2–6), oblong but pointed on distal end, marginless, cotyledons incumbent.

**Var. typica.** *S. ovalis* M. E. Jones, Proc. Calif. Acad. Sci. v<sup>2</sup>. 624 (1895); Piper, Mazama ii<sup>2</sup>. 109 (1900); Piper, Contrib. U. S. Nat. Herb. xi. 301 (1906); Frye & Rigg, Northwest Fl. 189 (1912); Piper & Beattie, Fl. Nw. Coast, 174 (1915); Rydb. Fl. Rky. Mts. 329 (1917); Flett, Fl. Mt. Rainier, 47 (1922); O. E. Schulz in Engler, Pflanzenr. iv<sup>105</sup>. 357 (1924) and Pflanzenf. xvii<sup>b</sup>. 656 (1936); St. John & Warren, Am. Midl. Nat. xviii. 969 (1937).—Cascade Mountains of Oregon and Washington.<sup>1</sup> OREGON: Three Sisters, 1881, *L. F. Henderson*. WASHINGTON: Mt. Adams, Aug. 12, 1882, *Howell* 3846 (US, type; M, NY, isotypes)<sup>2</sup>; Sept. 1877, *Suksdorf*; July 1899, *Flett* (US); Aug. 1892, *L. F. Henderson* (UW); Aug. 1894, *Lloyd* (NY); Mt. Rainier,

<sup>1</sup> *S. ovalis* is cited from the Olympic Mts. by G. N. Jones, Univ. Wash. Publ. Biol. v. 161 (1936). However, I have recently consulted with Dr. Jones and we have concluded that the specimens on which the report was based are immature *S. calycina*.

<sup>2</sup> The only specimen from Mt. Adams collected on Aug. 12, in the U. S. Nat. Herb., is that of Howell. M. E. Jones l. c. gave the year of the type-collection as 1892; however, even though Howell's specimen bears the date 1882, it is selected as the type since there seems to be no other alternative.



Aug. 1897, *Merriam* (US); Aug. 1895, *Piper* 2063 (US); Aug. 1934, *Thompson* 11,087 (G, M, UW); Aug. 1933, *Thompson* 10,000 (G, NY, US, UW); Aug. 1901, *Flett* 1999 (NY); Aug. 1892, *Allen* 61; July 1937, *G. N. Jones* 10,325; Indian Head Peak, Chelan Co., July 1921, *St. John* 4839 (G, M, NY); Mt. Maude, Chelan Co., Aug. 1933, *Morrill* 335 (UW); Mt. Stuart, July 1931, *Thompson* 7679 (NY, US); July 1898, *Elmer* 1095 (US); 1883, *Brandegee* 641 (US); head of Ingals Cr., Aug. 1898, *Whited* 838 (US); Wenatche region, Aug. 1883, *Tweedy* 865 (US); above Hidden Lakes, Okanogan Co., Aug. 1916, *McDaniels* 13,469 (US); Burch Mt., Okanogan Co., June 1934, *Thompson* 10,837 (G, NY, UW); Fremont Mt., Pierce Co., July 1934, *Thompson* 11,087 (M).

Var. **congesta** var. nov., caespitosa incana pubescenti-tomentosa; siliculis ovatis 4–6 mm. longis; stylo  $\pm$  1 mm. longo. Caespitose, pubescent throughout with long simple hairs; inflorescence corymbose, elongating only slightly in fruit; petals white or pinkish; pods ovate, truncate at base, tapering at apex; style  $\pm$  1 mm. long.—*S. calycina* Brewer & Watson, Bot. Calif. i. 42 (1876); Greene, Fl. Francis. 252 (1891) as to Calif. Pl. cited; Jepson, Man. Fl. Pl. Calif. 427 (1925) as to Calif. pl. cited; Jepson, Flora Calif. ii. 59 (1936) as to pl. cited. *S. ovalis* Rydb. Fl. Rky. Mts. 329 (1917) as to Calif. range; O. E. Schulz, l. c. as to Calif. pl. cited. CALIFORNIA: Lassen Peak, Shasta Co., 1875, *Lemmon* 21 (G, type; C, M, NY, isotypes); Aug. 1882, Mrs. R. M. Austin (C); undated, *Chestnut & Drew* 189 (ND).

Isolated nearly two hundred and fifty miles south of the nearest known collection of var. *typica*, this natural entity seems to have stabilized itself sufficiently to receive nomenclatorial designation. The outstanding characteristics are those of the pubescence which is of a long-villous type, covering the above-ground parts of the plants except the petals and fruits, and the siliques which are larger, longer, tapering at apex and tipped with a longer style than in var. *typica*.

*Smelowskia ovalis* is perfectly distinct from *S. calycina* with which it has been confused by some botanists. It is true that there is a marked superficial resemblance between specimens of the two species at anthesis or even when the fruits are young, but a closer scrutiny has consistently revealed differences which have been emphasized in the key and which are of a constant nature. The pronounced acicular hairs along the margins of the leaf-bases of *S. calycina* are exceedingly useful in determining vegetative or young specimens. In fruiting specimens a useful character for easy differentiation is found at the apex of the replum after the valves have been removed. In *S. ovalis* the replum forms an obtuse angle beneath the style, while in *S. calycina* the angle is invariably acute.



Var. *typica* of *S. ovalis* shows a perplexing variation in length and shape of pod and length of style, but a complete transition between the extremes has been repeatedly observed. *Thompson* 10,837 and *G. N. Jones* 10,325 from Mount Rainier, *Thompson* 10,837 from Burch Mt. and *Suksdorf's* specimen from Mount Adams all have pods which tend to be lanceolate, often approaching 4 mm. in length, and styles which usually approximate 1 mm. in length. However, the two *Thompson* collections show an almost complete transition from the ovoid short-styled pod more characteristic of the typical form of the species to the condition described above. Since these deviations from typical *S. ovalis* are neither stable nor geographically localized, they may be regarded as illustrating the natural variation of the species. This tendency of *S. ovalis* to vary toward *S. calycina* in pod-length and -shape as well as length of style points to its probable recent origin from the latter species. Assuming *Smelowskia* to have originated in south-central Siberia, where the largest number of species exist at the present time, the migration-route through Alaska to the Cordillera of North America is marked by the relict *C. calycina* var. *integrifolia*. This variety, now isolated from the parent species from both west and south, has been differentiated to its present biological status under environmental conditions strikingly different from those of the Altai and the Cordillera of our west, which have tended to preserve the specific nature of *S. calycina* var. *typica* in the two areas. It seems highly probable from the present geographic distribution of *S. calycina* that it formerly extended without disruption from the Altai to the Cordillera. From the restricted area in which *S. ovalis* is found, one might conclude that differentiation from the parent species took place after the genus had migrated well down onto the Cordilleran mountains.

*Smelowskia ovalis* reputedly grows at the highest elevation at which phanerogamic plants are found on Mount Rainier and other peaks of the Cascade Range.

#### SYNOPSIS OF THE GENUS POLYCTENIUM

- a. Pods somewhat bisulcate, decidedly flattened, pubescent at least when young, 5–8 mm. long, 1.5–2 mm. wide; plants rather densely pubescent. . . . . *P. Fremontii* var. *bisulcatum*.
- a. Pods not bisulcate, flattened or nearly terete, glabrous, 6–13 mm. long, 1–1.5 mm. wide; plants sparsely pubescent  
*P. Fremontii* var. *typica*.

*P. FREMONTII* (Watson) Greene. Perennial, more or less caespitose; stems few to several from a branching naked caudex, simple or rarely



branched, sparsely to abundantly pubescent with simple or branched hairs, 5–15 cm. long; basal leaves sessile, 1–2 cm. long, pinnately divided into linear divisions, pubescent with stiff simple or forked or dendritic hairs, segments pungent; cauline similar, sessile, several to many, 5–12 mm. long; pedicels ascending, pubescent or glabrous, 4–6 mm. long; inflorescence corymbose, becoming racemose in fruit; sepals oblong, glabrous or slightly pubescent, 2–3 mm. long, 1–1.5 mm. broad; petals white, cuneate, truncate at apex, 5–6 mm. long, 3–4 mm. broad; pods glabrous, flattened contrary to septum or nearly terete, 6–13 mm. long, 1–1.5 mm. wide; style less than 1 mm. long, stigma unexpanded; seeds numerous (12–28), marginless, 1 mm. long, attached by a weak funiculus 1 mm. long, cotyledons incumbent.

Var. **typicum**. *P. Fremontii* Greene, Leaf. ii. 219 (1912). *Smelowskia* ? *Fremontii* Watson, Proc. Am. Acad. Arts & Sci. xi. 123 (1875). *S. Fremontii* Brewer & Watson, Bot. Calif. i. 42 (1876); Robinson in Gray, Syn. Fl. No. Am. i<sup>1</sup>. 136 (1895); Howell, Fl. Northw. Am. i. 57 (1897); Frye & Rigg, Northw. Fl. 189 (1912); Schulz in Engler, Pflanzenr. iv<sup>105</sup>. 358 (1924); Jepson, Man. Fl. Pl. Calif. 427 (1925); Tidestrom, Contrib. U. S. Nat. Herb. xxv. 239 (1925); Jepson, Fl. Calif. ii. 59 (1936). *S. Fremontii* var. *glabella* Schulz l. c. 359. *Braya pectinata* Greene, Erythea iii. 69 (1895). *P. glabellum* Greene, l. c.—Northern California and southern and eastern Oregon to central Idaho. IDAHO: Sawtooth Nat. Forest, 1910, *C. N. Woods* 28 (RM). CALIFORNIA: without locality, 1873, *J. G. Lemmon*; Ewing Creek, Modoc Co., May 1894, Mrs. *R. M. Austin* (C, type of *Braya pectinata* Greene); Modoc Co., May 1879, Miss *S. A. Plummer*; Portola, Plumas Co., July 1911, *K. Brandege* (C); Plumas Co., June 1878, Mrs. *R. M. Austin*; Eagle Lake and Madeline Plains, Lassen Co., *J. G. Lemmon* (C); Bray, Siskiyou Co., May 1913, *L. E. Smith* 227. OREGON: head of Dry Creek, Malheur Co., May 1896, *Leiberg* 2147 (US, NY, type and isotype of *P. glabellum* Greene); camp at Dry Creek, Crook Co., June 1894, *Leiberg* 336 (C, G); base of Steens Mts., May 1885, *Howell* 351; June 1885, *Cusick* 1246; hills about Lake Klamath, Klamath Co., May 1846, *Fremont* 384 (G, TYPE); Swan Lake Valley, Klamath Co., May 1896, *Applegate* 41; stony dry swales of desert, Harney Co., June 1901, *Cusick* 2612 (C, G); 7 mi. west of Riley, Harney Co., May 1914, Mrs. *R. D. Cooper*; north end of Summer Lake, Lake Co., June 1911, *Eggleston* 6856a; Bear Valley, Blue Mts., May 1885, *Howell* 769 (C); Prineville to Button Springs, June 1894, *Leiberg* 336 (US).

Var. **bisulcatum** (Greene), comb. nov. Caespitose, rather densely pubescent with branched hairs; sepals pubescent; pods decidedly flattened contrary to replum, pubescent at least when young, somewhat bisulcate, 5–8 mm. long, 1.5–2 mm. wide.—*P. bisulcatum* Greene, Leaf. ii. 220 (1912). *Smelowskia Fremontii* var. *bisulcata* O. E. Schulz op. cit.—Known only from the type-collection, OREGON: Silvies Valley, Blue Mts., May 1885, *Howell* 346 (US, TYPE; G, NY isotypes).



*Polyctenium Fremontii* is reasonably homogeneous and occupies a geographical area which is unbroken by any major barrier. As the species is here interpreted, the natural variation easily includes Greene's *P. glabellum* which appears to be only a lax form developed as a result of shading or perhaps the receipt of a larger amount of water than the species normally obtains. Indeed Leiberg's notation "along streams" on the type-specimen is significant in this connection, since the species is usually found in a dry habitat. The laxity of habit, inflorescence and foliage, the branching stems and scanty pubescence of Greene's type are approached by a specimen collected in June 1894, between Prineville and Button Springs, Oregon, by Leiberg. These characters, though not quite typical, are possessed to a lesser extent by other plants throughout the natural range of the species. Thus it is evident that *P. glabellum* should be considered synonymous with the older *P. Fremontii*, even though Schulz, op. cit., who saw no specimens, retained it as a variety.

Possessing many features in common with *P. Fremontii* but with short, flattened, pubescent and somewhat bisulcate pods, *P. bisulcatum* Greene appears sufficiently distinct to require nomenclatorial recognition, but in varietal rank. A specimen, loaned for study by the Herbarium of the University of California and possessing short obtuse pods, a prominent style and other minor characters, was collected by Mrs. R. M. Austin in California. This specimen, probably representing a new and undescribed variety, is related to var. *bisulcatum* by virtue of its short pods but is otherwise distinctive. It is left undescribed because the material is fragmentary and accurate data are lacking.

#### EXPLANATION OF PLATE 496<sup>1</sup>

A, POLYCTENIUM. FIGS. 2-10: POLYCTENIUM FREMONTII var. TYPICUM. FIGS. 11-13: P. FREMONTII var. BISULCATUM. FIG. 2: diagram of a transverse section, at lower filament-level, of a young flower, *c* sepal, *p* petal, *ls* long stamen, *ss* short stamen, *s* septum, *g* gynoeceium. FIG. 3: diagram of transverse section through mature silique. FIGS. 4 and 5: two lateral views (at right angles to each other) of a mature silique. FIG. 6: transverse section of a seed. FIG. 7: sepal. FIG. 8: petal. FIG. 9: lateral view of seed. FIG. 10: stamen.

B, SMELOWSKIA. FIGS. 14-17 and 22-27: SMELOWSKIA CALYCINA var. TYPICA. FIG. 18: S. OVALIS var. CONGESTA. FIGS. 19-21: S. OVALIS var. TYPICA. FIG. 14: diagram of a transverse section, at lower filament-level, of a young flower, symbols as in FIG. 2. FIG. 15: diagram of a transverse section through mature silique. FIG. 16: lateral view of a mature silique. FIGS. 17, 18 and 19: lateral view of replum of three entities. FIG. 20: lateral view of silique. FIG. 21: lateral view of seed.

<sup>1</sup> All figures  $\times 3\frac{1}{2}$ , except 2, 3, 14, and 15 which were drawn free-hand from a microscopic enlargement.



## IV. THE NAMES OF THREE SPECIES OF BRASSICA

LOUIS C. WHEELER

Three mustards introduced as weeds in North America are commonly known under untenable names. They have been known as *Brassica alba* (L.) Rabenhorst, *B. arvensis* (L.) Rabenhorst, and *B. adpressa* (Moench) Boiss. Under *Sinapis* the first two are perfectly valid. But *Sinapis* seems scarcely worthy of generic rank. The following study of the nomenclature of these three species is based on the synonymy given by O. E. Schulz, *Pflanzenreich* IV. 105(1):—1919. Of course the specific names cited under the varieties of each species are included in the elimination. The fact that Schulz considered the misapplication of a name as publication of a new species accounts for the large number of specific names attributed by him to various authors when the names were merely “*sensu*,” i. e., misapplied.

**BRASSICA HIRTA** Moench, *Suppl. Methodum Pl.*, 84. 1802. This is the earliest available name for what has long been known in American manuals under the name of *Brassica alba* (L.) Rabenhorst, *Fl. Lusatica* 1: 184. 1839 (Boissier, *Voy. Espagne* 2: 39. 1839–45 is more generally given as the combining author but the date of his publication is uncertain), based on *Sinapis alba* L., *Sp. Pl.* 2: 668. 1753; not *Brassica alba* Gilibert, *Fl. Lituanica*. I have not seen this reference, cited “ii. 63” by *Index Kewensis* (also cited “IV. (1782) 63,” by O. E. Schulz, l. c., 83.), but I have seen what is supposed to be the same paper in Uster, *Delectus Opusculorum Bot.* 2: 361. 1785. Here Gilibert described his *B. alba* as a new species. There are the two following preoccupied names which are earlier than Moench’s: *Raphanus albus* Crantz, *Classis Cruciform. Emend.*, 109. 1769, proposed without reference to *Sinapis alba* L., though the same two pre-Linnaean polynomials are cited in both cases; not *Brassica alba* Gilibert, *vide supra*. “*Sinapis nigra* Kerner, *Abbild. oekonom. Pflanz.* V (1792) t. 465;” cited by Schulz, l. c., 130, but not confirmed, is preoccupied by *Brassica nigra* (L.) Koch, 1833, if it is not a mere misapplication of *Sinapis nigra* L.

**BRASSICA kaber** (DC.), *comb. nov.* *Sinapis kaber* DC., *Syst.* 2: 617. 1821.

This is the plant that, under the genus *Brassica*, has commonly been called *B. arvensis* (L.) Rabenhorst, *Fl. Lusatica* 1: 184. 1839, based on *Sinapis arvensis* L., *Sp. Pl.* 2: 668. 1753; not *Brassica*



*arvensis* L., Mantissa, 95. 1767. *Sinapis orientalis* L., Cent. Pl. 1: 19. 1755; not *Brassica orientalis* L., Sp. Pl. 2: 666. 1753. “*Sinapis arvensis* Curtis, Fl. londin. 1. ed. II (1777–1787) t. 321,” (Schulz, l. c., 123) was a mere varietal misapplication of *Sinapis arvensis* L. *Raphanus orientalis* Crantz, Classis Cruciform. Emend., 109. 1769, was published without reference to *Sinapis orientalis* L. but the same polynomial of Tournefort was cited under both; not *Brassica orientalis* L., 1753. *Sinapis torosa* Gilibert, Fl. Lituanica (reference not seen, given as “ii. 69” by Index Kewensis, and “IV. (1782) 69” by Schulz, l. c., 119) is an abortive name since, according to the transcript of the description kindly supplied by Mr. Ramsbottom of the British Museum, *Sinapis arvensis* L. was cited in synonymy. Illegitimate names are not to be taken into consideration for purposes of priority (Rules, Art. 60. 1935). “*S. nigra* Rozier, Dict. Univ. Agricult. VI. (1785) 676, t. 23;” (Schulz., l. c., 119) not seen, probably *S. nigra* L. *sensu* Rozier; if not, preoccupied by *Sinapis nigra* L., 1753. *Raphanus arvensis* Crantz, Classis Cruciform. Emend., 109. 1796, not based on *Sinapis arvensis* L. but description identical and the same two pre-Linnaean polynomials cited in synonymy, not *Brassica arvensis* L., 1767. “*Sinapis orientalis* Schkuhr, Bot. Handb. II. (1805) 264, t. 186, non L.” (Schulz, l. c., 123–4) must be *S. orientalis* L. *sensu* Schkuhr. There are no authors cited by Schkuhr for adjacent species in this genus but in view of the fact that the *Sinapis* names are identical with those published by Linnaeus it seems reasonable to consider them as Linnaean species. Even if this were a new species it is preoccupied under *Brassica* by *B. orientalis* L., 1753.<sup>1</sup> “*Raphanus raphanistrum* Kerner, Oekon. Pfl. II. (1788) 98, t. 166, non L.” (Schulz, l. c., 119) is probably a *sensu* name but the reference is not available. If it is new it is preoccupied by *R. Raphanistrum* L., 1753. “*S.[inapis] hispida* Balbis, Miscell. Bot. (1804–1806) 33, non Schousb.” (Schulz, l. c., 123) is really a *sensu* name which traces nomenclatorially to *S. hispida* Schousb. which Schulz, l. c., 134, identifies with *S. flexuosa* Poiret. *Sinapis polymorpha* Generisch apud Schultes, Obs. Bot., 133. 1809, is an apparently abortive name seemingly based on *S. laevigata* L.; not *Brassica polymorpha* Murray “in Nov. Comment. Soc. Reg. Scient. Gotting. VII. (1776) 35 t. VI”

<sup>1</sup> The date given by Schulz, l. c., 123, for Schkuhr's Handb. seems to be in error. Pritzel lists two editions only and both are before me. Vol. 2, ed. 1, bears the date 1791, vol. 2, ed. 2, bears the date 1808. Pagination is identical at least for *Sinapis orientalis*.



(Schulz, l. c., 84), original not seen but the name checked in Linn. Syst. Veg. ed. 14: 601. 1784. *Sinapis villosa* Mérat, Nouv. Fl. Envir. Paris, 265. 1812; not *Brassica villosa* Bivona-Bernardi, "Stirp. rar. Sicil. descr. Manip. IV. (1816) 20;" (Schulz, l. c., 38), not seen but confirmed in Sprengel, Syst. Veg. ed. 16, 4: Cur. Post. 243. 1827. "*S.[inapis] taurica* Fischer!, Catal. Hort. Gorenk. (1812) 51; DC. Syst. II. (1821) 617 et Prodr. I. (1824) 219 (excl. Marsch. Bieb.)," (Schulz, l. c., 119), is another *sensu* name. This name was first published by Fischer in his Catalogue du Jardin des Plantes du Comte A. de Razoumoffsky à Gorenki, ed. 2: 51. 1812, where it appears without description and is credited to M.[arschall von] B.[ieberstein]. As Fischer learned later, the plants raised in Razoumoffsky's garden from seeds sent by Marschall were not the plant which Marschall described in 1819, which was *Brassica geniculata* (Desf.) Ball, but *Sinapis arvensis*, as was shown by Fischer & Meyer, Index Seminibus Hortus Petropolitanus 1: 38. 1835. It is easy for confusion to arise in plants raised from seeds. Garden labels may be misplaced or the wrong seeds may have been planted. Whatever caused the confusion, the error was not rectified in time to prevent de Candolle from drawing his description for the Systema and Prodromus at least in part from a specimen prepared by Fischer from the plant of the Razoumoffsky garden. This explains Schulz' citation. . . . "*S. incana* Kit. ap. Schultes, Österr. Fl. 2. Aufl. II. (1814) 265, non L.," (Schulz, l. c., 123) is really *S. incana* L. *sensu* Kit., for, through the reference "S. P. III. 558.," it traces through Willd., Sp. Pl. 3(1): 558. 1801 (date fixed by Rules, Art. 45. 1935), to L., Cent. Pl. 1: 19. 1755. *Sinapis retrohirsuta* Besser apud Steudel, Nomencl. ed. 1: 782. 1821, *nomen nudum*.

The specific name *Brassica kaber* applies to the plant called *Sinapis arveniss* L. var. *brevirostris* (Spach) O. E. Schulz. This is not the plant of America according to Schulz' interpretation. The two following varietal names apply to the plants of the New World:

BRASSICA KABER (DC.) Wh. var. **pinnatifida** (Stokes) comb. nov. *Sinapis arvensis* L.  $\beta$  *pinnatifida* Stokes, Bot. Mater. Medic. 3: 478. 1812. Type-locality: apparently England. (*S. arvensis*  $\alpha$  *integrifolia* Stokes, l. c., 477). This is typical *Brassica arvensis* (L.) Rabenhorst. (*B. sinapistrum* Boiss., Voy. Espagne 2: 39. 1839-45, based on *Sinapsis arvensis* L.).

BRASSICA KABER var. **Schkuhriana** (Reichenb.) comb. nov. *Sinapis Schkuhriana* Reichenbach, Icones Fl. Germ. 2: 20, t. 87, fig. 4425b. 1837-8. *S. arvensis* L.  $\beta$  *Schkuhriana* Reichenb. apud Hagenbach, Fl. Basil. Suppl., 138. 1843. *Brassica arvensis* (L.) Rabenh.



var. *Schkuhriana* (Reichenb.) Thellung apud Schinz & Keller, Fl. Schweiz. ed. 3, 2: 131. 1914.

BRASSICA GENICULATA (Desf.) J. Ball in Journ. Linn. Soc. Bot. 16: 327. 1878, based on *Sinapis geniculata* Desf., Fl. Atlantica 2: 98. 1798.<sup>1</sup> Type-locality: North Africa.

This is the plant which has generally passed as *Brassica adpressa* (Moench) Boiss. in California, where it is a common weed. The following synonymy shows why *B. geniculata* is the valid name for this species. *Sinapis incana* L., Cent. Pl. 1: 19. 1755, basis of *Brassica incana* (L.) Meigen, Deutschl. Fl. 3: 270. 1842; not Tenore, Prod. Fl. Napol., p. xxxix. 1811–15 (not seen but kindly verified by Miss M. L. Green of Kew). *Raphanus incanus* Crantz, Classis Cruciform. Emend. 110. 1769, proposed without reference to *Sinapis incana* L. but doubtless identical since the same polynomial is cited; not *Brassica incana* Tenore, 1811–15. “*Sinapis incana* Jacq. Hort. Vindob. 2: 79, t. 169. 1772,” cited by Schulz, l. c., 141, under *Hirschfeldia incana* (L.) Lagrèze-Fossat var. *hirta* (Babington) O. E. Schulz, is really *Sinapis* (or *Hirschfeldia*) *incana* L. *sensu* Jacq. which was merely a varietal misapplication. *Hirschfeldia adpressa* Moench, Method., 264. 1794 is an abortive name, since *Sinapis incana* L. was cited in synonymy, consequently this name is not to be considered for purposes of priority (Rules, Art. 60. 1935), and *Brassica adpressa* (Moench) Boiss., Voy. Bot. Espagne 2: 38. 1839–45, must not be used since there are earlier available names. “*Sinapis nigra* Pallas, Tabl. Taurid. (1795) 54;” (Schulz, l. c., 137), is probably *S. nigra* L. (1753) *sensu* Pallas; if not, it is preoccupied both under *Sinapis* and under *Brassica*.

## V. POLYGONUM KELLOGGII AND ITS ALLIES

LOUIS C. WHEELER

This paper presents a taxonomic synopsis of five small annual species of *Polygonum*, section *Avicularia*, of which *P. Kelloggii* Greene is the most widespread. The confusion as to the identity of the types of the species as well as to their delimitation makes this synopsis worth while. The following key summarizes the specific distinctions:

Anther-bearing stamens 8.

Leafy bracts of inflorescence well differentiated from leaves of lower stem by an evident white margin and greater relative breadth.

<sup>1</sup> Stearn, Journ. Soc. Bibliogr. Nat. Hist. 1: 147–8. 1938.



- Inflorescence broadly oblong or ovoid, often nearly as broad as long. . . . . 1. *P. polygaloides*.  
 Inflorescence slenderly cylindric, 4–12 times as long as broad. . . . . 2. *P. esotericum*.  
 Leafy bracts of inflorescence little different from leaves of lower stem, white margin lacking generally, never more than a hairline. . . . . 3. *P. Watsonii*.  
 Anther-bearing stamens 3.  
 Plants mostly less than 8 cm. tall, often sprawling; leafy bracts of inflorescence rarely white-margined; inflorescence either terminal or extending well down the stems. . . . . 4. *P. Kelloggii*.  
 Plants mostly 8–19 cm. tall, erect; bracts of inflorescence with an evident white margin; inflorescence always terminal. . . . . 5. *P. confertiflorum*.

Unless otherwise indicated all specimens cited below are in the Gray Herbarium.

1. *POLYGONUM POLYGALOIDES* Meisner, DC. Prod. **14**: 101. 1856.— Type locality: "In Clear-Water, Oregon (Spalding)." (The Rev. Spalding lived at "Lapwai on the Clearwater River a dozen miles above its mouth."<sup>1</sup> This is now in Nez Perce County, Idaho. Spalding's specimens collected in this general vicinity were distributed as from "Clearwater, Oregon." Probable isotype at Gray Herbarium. Range: Eastern Washington, northeastern Oregon, Idaho, and reported by Small, Mem. Dept. Bot. Columbia Coll. **1**: 136. 1895 (Monogr. N. Am. Polygonum), from Montana.

2. *POLYGONUM* (*AVICULARIA*) **esotericum** sp. nov. (FIG. 1). Annuum, glabrum, nanum; caule erecto vel declinato, 6–14 mm. longo; ochreis hyalinis, tripartitis; foliis linearibus, acutis, 8–10 mm. longis; bracteis imbricato-adpressis, 2–5 mm. longis, lanceolatis vel oblongo-lanceolatis, prominulo-1-nerviis medio circumscripte viridibus margine albido-membranaceis; inflorescentiis terminalibus, racemosis, graciliter cylindræis, folioso-bracteatis, 2–7 cm. longis; floribus 8-andris; calyce 1.8–2.2 mm. longo, 5-partito, carinato-trigono; achaenio triquetro vel basi subtereto, faciebus anguste lanceolatis vix ovato-lanceolatis, laevissimo nitido vix reticulato-striato opaco.

Glabrous annual herb; stem erect or at first declined, 6–14 cm. long, with several erect branches from near the base; leaves linear, 8–10 mm. long, acute, falling early; leafy bracts of inflorescence ascending-appressed, 2–5 mm. long, lanceolate to oblong-lanceolate, midrib elevated on lower surface, margin white, scarious, mostly reflexed, mainly entire: ocreae membranous, scarious, sheathing, 3-parted, jointed to leaves and leafy bracts; inflorescence a terminal, slenderly cylindric, spicate raceme 2–7 cm. long; flowers shortly pedicelled, 1–3 in the axil of each bract; fruiting calyx nearly equaling to slightly exceeding the achene, 2–3 mm. long, five-parted to below the middle, segments oblong-lanceolate, 2 outer manifestly longer than the rest even in bud, tips of the 2 outer segments folded together and united;

<sup>1</sup> Chas. H. Chapman, The Story of Oregon and Its People, 85. 1909.



stamens with anthers 8 (vide infra), 3 inner filaments dilated below; styles 3, short, capitate; achene 1.8–2.2 mm. long, shorter than to slightly exceeding the calyx, pale brown, shining, narrowly lanceolate in outline, and subterete below and trigonous above, to longitudinally striate-reticulate, dark brown and ovate-lanceolate in outline and

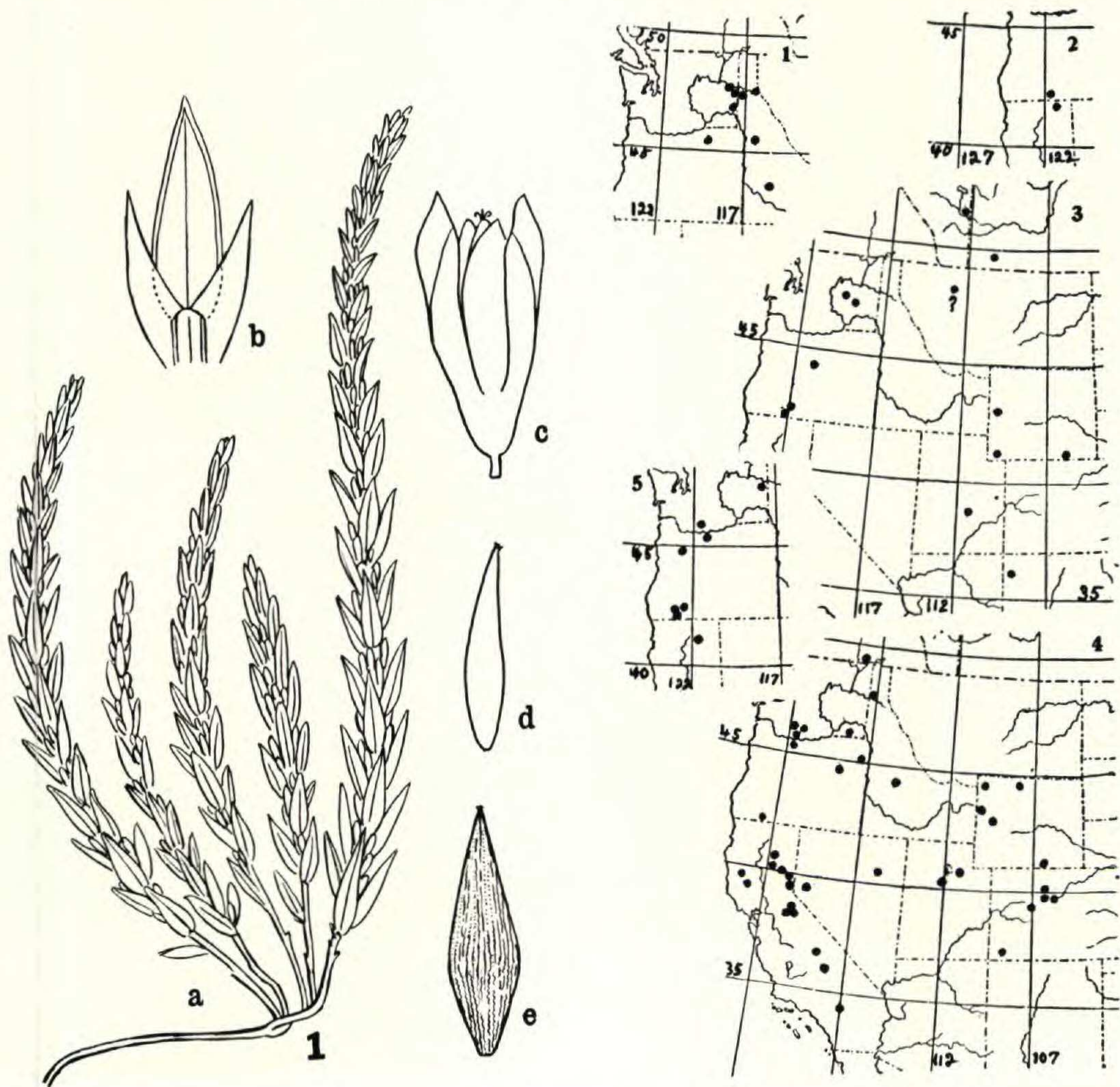


FIG. 1. *POLYGONUM ESOTERICUM*. *a*, Habit  $\times 1$ ; *b*, Bract of inflorescence  $\times 3$ ; *c*, Flower  $\times 8$ ; *d*, Outline of smooth slender achene  $\times 8$ ; *e*, Striate-reticulate achene  $\times 8$ . All from the type.

MAP 1, Range of *POLYGONUM POLYGALOIDES*; 2, of *P. ESOTERICUM*; 3, of *P. WATSONII*; 4, of *P. KELLOGGII*; 5, of *P. CONFERTIFLORUM*.

trigonous throughout.—The following collections are referred here: CALIFORNIA: Modoc Co., dry sunny seasonally submersed adobe bed of artificial lake, with *Pogogyne zizphoroides* Benth, *Plagiobothrys leptocladus* (Greene) I. M. Johnst., *Downingia elegans* Torrey, and *Psilocarphus globiferus* Nuttall, Rim Rock Valley Reservoir (Section 21, Township 46 North, Range 12 East, Mount Diablo Meridian), Devils Garden, Aug. 25, 1935, *Louis C. Wheeler 3918* (Gray Herbarium,



TYPE; author's herb., isotype), 3919 (Gray Herb.). OREGON: Klamath Co., dry pond-basins, Swan Lake Valley, July 19, 1895, *E. I. Applegate* 620. This last collection is rather over-mature but seems to belong here. MAP 1.

The two collections from California, though from the same locality, represent two slightly different elements. The two were growing intermingled though they showed a barely perceptible difference in their environmental preferences. One preferred spots an inch or two lower which would be wet later. No. 3918 has all eight stamens with fertile anthers, its inflorescence less dense, and the leafy bracts with narrower white margins; achenes narrowly to broadly lanceolate in outline and the narrowest smooth and pale brown. No. 3919 has the inner whorl of three stamens with fertile anthers but the outer whorl of five with shrivelled mostly sterile anthers, its inflorescence more dense and the leafy bracts with wider white margins; achenes lanceolate to ovate-lanceolate in outline, the narrowest smooth but chocolate-brown. The occurrence of these two entities, one obviously evolved from the other or both from a common ancestor, together and yet, so far as observed, without intermediates, is very puzzling. This would seem to cast doubt on the universal applicability of the belief, variously expressed but rather generally held, that a space-barrier of some sort is necessary for the isolation of an incipient new organic entity from its immediate ancestor. This may be a fairly valid rule for animals but in plants polyploidy or physiological factors of various sorts may create an effective barrier against formation of fertile hybrids, or may separate the flowering periods thus creating a chronological barrier.

The race of *P. esotericum* with only 3 fertile stamens can be distinguished from *P. confertiflorum* and *Kelloggii* by its very slender inflorescence and narrower achenes as well as by the rudimentary sterile anthers on the outer whorl of 5 stamens. Though the key is believed to be workable as stated, the sterile anthers in this race of *P. esotericum* are so small that they are difficult to see with a hand lens.

3. *P. WATSONII* Small in Mem. Dept. Bot. Columbia Coll. 1: 138. 1896, based on *P. imbricatum* Nutt. apud. S. Wats., Amer. Nat. 7: 665. 1873 (in King, Rep. Geol. Expl. 40th Par. 5: 316. 1871, in synonym.), not Raf., Fl. Tell. 3: 16. 1837.<sup>1</sup>—Type: "R[ocky] Mts.—U[pper] Calif.", Nuttall (Gray Herb.).

That the type of *P. imbricatum* (and therefore of *P. Watsonii*) probably came from outside California as now delimited is suggested by

<sup>1</sup> See Barnhart, *Torreya* 7: 182. 1907 as to date.



the fact that no other specimens of this species purporting to have come from California have been seen. The plant illustrated by Small, idem, as *P. Watsonii* is *P. confertiflorum* Nutt. as Piper, Contr. U. S. Nat. Herb. **11**: 228. 1906 (Fl. Washington), maintained. The description at least in large part also applies to *P. confertiflorum* but neither the figure nor description of the calyx applies to either *P. confertiflorum* or *P. Watsonii* but agrees essentially with *P. Kelloggii*. Piper, idem, considered *P. Watsonii* identical with *P. Kelloggii*. He placed his faith in the character of the surface of the achene. It happens that the type of *P. Watsonii* has both smooth and reticulate achenes which may still be observed *in situ*. Piper noticed a smooth achene and assumed that all were smooth. Other specimens of *P. Watsonii* have dimorphic achenes. Surface dimorphism of *Polygonum* achenes was noted by Watson, King, Rep. Geol. Expl. 40th Parallel **5**: 316. 1871 (*sub P. coarctatum* var. *minus*) for the plants included in *P. imbricatum* Nutt. Other types of achenial dimorphism in *Polygonum* have been noted by Bicknell, Bull. Torr. Club **36**: 450. 1909 (Fl. Nantucket), and by Small, l. c., **24**: 46. 1897.

The following exsiccatae will illustrate my interpretation of the species and show its range: CANADA: Cypress Hills, Great Plains (in both Alberta and Saskatchewan, center at 110° W. long., 49° 40' N. lat.), *J. Macoun* 149. ALBERTA: Hand Hills, *J. Macoun* 190. MONTANA: Teton Co.?, Birch Lake, *Wm. M. Canby* 279. WYOMING: Sublette Co., New Fork Lakes, *E. B. & L. B. Payson* 4381. Uinta Co., Jackson's Lake, *Aven & Elias Nelson* 6556. Albany Co., Chimney Park, *E. Nelson* 656. UTAH: Garfield Co., Aquarius Plateau, *P. A. Rydberg & E. C. Carlton* 7476. NEW MEXICO: San Juan Co., Tunitcha Mts., *P. C. Standley* 7632. WASHINGTON: Grant Co., Coulee City, *C. V. Piper* 3901, 3902. Adams Co., Ritzville, *J. H. Sandberg & J. B. Leiberger* 200. OREGON: Klamath Co., 12 mi. w. of Keno, *M. E. Peck* 9308; Pelican Bay, w. side Upper Klamath Lake, *M. E. Peck* 9509. Crook Co., Button Springs, *J. B. Leiberger* 367.

4. *P. KELLOGGII* Greene, Fl. Franciscana, 134. 1891.—Type: near Donner Lake, Sierra Nevada, Nevada Co., California, Dr. A. Kellogg in 1870. Dr. Theodor Just kindly examined the Herbarium Greeneanum at Notre Dame and reports that Greene indicated as type the above collection in his herbarium. *P. unifolium* Small in Mem. N. Y. Bot. Gard. **1**: 129. 1900 (Fl. Montana), type: Cedar Mts., Montana, *Rydberg & Bessey* 5367 (Herb. N. Y. Bot. Gard.), this specimen marked "type" by Rydberg. *P. minutissimum* L. O. Williams, Ann. Mo. Bot. Gard. **21**: 343. 1934, may belong here. Range: British Columbia, Washington, Oregon, California, Idaho, Wyoming, Colorado, Utah, Nevada.



All references to the occurrence of *P. Watsonii* in California are in error, as far as the specimens I have examined are concerned and according to my interpretation. Most, perhaps all, such references are to plants referable to *P. Kelloggii*. Jepson, Fl. Calif. 1:382-3. 1914, maintained both *P. imbricatum* and *P. Watsonii*. He excluded the synonymic type upon which *P. Watsonii* was based and evidently intended to apply the name to the supposed entity defined by Small under that name. Since Small's description applies mainly to *P. confertiflorum*, Jepson's application of Small's description is largely in error. From Jepson's description it appears that he applied *P. imbricatum* to the very race upon which Greene based *P. Kelloggii* (I am applying *P. Kelloggii* in a broader sense) and that he applied *P. Watsonii* in such a way as to include plants with 3 anther-bearing stamens (here interpreted as *P. Kelloggii*) as well as those extralimital plants with eight anther-bearing stamens (here interpreted as *P. Watsonii*) so long as they had dark-colored more or less striate achenes. *P. imbricatum* Nutt. var. *Watsonii* Small apud Jepson, Man. Flow. Pl. Calif., 290. 1923<sup>1</sup> is based on the same confusion and interpretation as Jepson's previous use of both names in specific rank. It would be interesting to know what Jepson took as the type of *P. Watsonii* Small. Incidentally it is only by taxonomic inference and similarity of the name that the var. *Watsonii* is assumed to be based on the species *Watsonii* for no name-bringing synonym is cited and there is no indication that the variety was new.

*Polygonum Kelloggii* Greene, as here defined, is an aggregate of numerous apparently hopelessly intergrading races. The particular race which Greene described is perhaps best represented in the extreme by *Smiley 690* cited below. *A. A. Heller 6929*, "From type locality," Donner Lake, Sierra Nevada, Nevada Co., California, has some dark brown, conspicuously reticulate achenes in some plants. All the plants have the leafy bracts pointing upward, rather than spreading as in *Smiley 690*. The habit of the bracts in *Heller 6929* combined with the dark achenes makes this collection intermediate between what Greene, l. c., 135, called *P. imbricatum* and his new species *P. Kelloggii*. Some few collections contain plants that are taller than the measurements given in the key. The two following collections are, on the average, taller than 8 cm. and one plant is 12 cm. tall: CALIFOR-

<sup>1</sup> Title-page date questionable but here accepted for convenience as no conflict as to priority is involved.



NIA: Yosemite National Park, near Dark Hole, Tioga Road, altitude 7,600 ft., *F. J. Smiley* 883; Yosemite Valley, altitude 4,000–4,500 ft., *L. R. Abrams* 4502. These two, with the third collection cited below, represent a local race of *P. Kelloggii* characterized by short, broad, pale, reticulate achenes; generally greater height; and compact inflorescence: Cathedral trail to Mt. Tallac, alt. 6,700 ft., Sierra Nevada, California, *F. J. Smiley* 209. This race is distinguished readily from *P. confertiflorum* by the absence of white margins on the bracts and by the pale short achenes. Occasional collections of *P. Kelloggii* show very narrow white margins on the bracts: OREGON: Dead Indian Valley, summit of Cascade Mts., *W. C. Cusick* 2953; CALIFORNIA: Round Valley, Mendocino Co., *J. W. Blankinship*, June 8, 1873, *s. n.* This last closely approaches *P. confertiflorum*. Plants of very distinctive appearance are those from Lake Tenaya, Yosemite National Park, California, *F. J. Smiley* 690. Though heavily fruiting these plants have entirely simple stems not over 2 cm. high. But *A. Eastwood* 487 from the same place has the more usual habit of *P. Kelloggii* and smooth pale achenes which match those of *Smiley* 690. This race with smooth, short, pale achenes seems to be confined to the Sierra Nevada, California. *P. unifolium* Small represents another apparent race with elongated lower internodes and very short terminal inflorescence. Whether this habit is hereditary or due to crowding by other low herbs is difficult to decide. The presence of both the usual sprawling and the erect habit in various collections, as Snake River, Uinta Co., Wyoming, *A. & E. Nelson* 6463 (distributed as *P. polygaloides*), suggests that the erect habit is ecological.

It may be possible by careful study of a large series of specimens to recognize and define several minor entities from the aggregate here included in *P. Kelloggii*. Criteria which may prove useful but which must be carefully weighed, rather than assumed to be usable and arbitrarily applied, are: general habit; differentiation of leaves; aggregation of inflorescence; relative length of calyx-segments and length of the conduplicate and united tips of the longer ones; presence or absence of sterile stamens; shape, surface, and color of achenes.

5. *P. CONFERTIFLORUM* Nutt. apud Piper in Contr. U. S. Nat. Herb. 11: 228. 1906 (Fl. Washington), not Dougl. apud Hooker, Fl. Bor.-Am. 2: 132. 1838,<sup>1</sup> in synonymy. TYPE: "Columbia, &c. plains" [quoted from the label], *Nuttall* (Herb. Gray). *P. conferti-*

<sup>1</sup> See *Erythea* 1: 160. 1893 as to date.



*folium* Nutt. apud S. Wats. in King, Rep. Geol. Expl. 40th Parallel 5: 316. 1871, in synonymy. Based on the same specimen as Piper's similar name. Piper misread the name Nuttall had written on the label of the type. Whether the name should be "corrected" is difficult to decide. There is the unhappy possibility that *P. confertiflorum* Dougl. may have been validated before Piper's validation of Nuttall's name. However, Douglas' name does not seem to have been validated.—Range: WASHINGTON: Spokane Co., Spangle, W. N. Suksdorf 4777. Klickitat Co., Falcon Valley, W. N. Suksdorf 478. OREGON: Marion Co., Salem, J. C. Nelson 1614. Josephine Co., Grants Pass, C. V. Piper 6264; Takilma, M. E. Peck, 8145. Jackson Co., Fall Creek, E. B. Copeland 3469. Wasco Co., Mosier, J. W. Thompson 5156. CALIFORNIA: Shasta Co., Goose Valley, A. Eastwood 1022.

*P. confertiflorum* is usually readily distinguishable from *P. Kelloggii* by the characters in the key. Confusing plants are discussed above.

The number of anther-bearing stamens in this group of five species is either three or eight. The plants in which I find but three anther-bearing stamens have often been described as having five stamens, yet in the ninety-six odd collections in which stamens were counted the numbers were all either three or eight anther-bearing stamens except for one case in *P. confertiflorum* in which there was a fourth filament bearing a rudimentary anther in one flower. Except for this case and *Wheeler* 3919, discussed under *P. esotericum*, all anthers present were fertile. The anthers fall at a touch in dissecting mature flowers. Consequently counts are best made in unopened flowers. Perhaps counts of "five" have been made by counting filaments in mature flowers in which the anthers had fallen without consideration of whether the filaments had borne anthers. It appears that in these five species there is an inner whorl of three stamens which are always fertile and a potential outer whorl of five stamens. This outer whorl may be reduced to such an extent that it may not be manifested by any external structure, or represented by filaments of various sizes, or present as five anther-bearing stamens. It would be reasonable to suppose that there might be intermediate numbers of anther-bearing stamens but except for the one case noted none was found. In order to check the possibility that both three and eight anther-bearing stamens might occur in different flowers on the same plant two flowers were examined from one plant in about half the collections studied and no plants were found with both three and eight fertile stamens. The possibility that, while the number of anther-bearing



stamens was uniform in one plant, different plants in the same population might have different numbers was checked by two methods: (1). The anther-bearing stamens were counted in one flower in each of ten plants in one collection (Oregon, *Leiberg 240*) of *P. Kelloggii* and all had three. The same count was made in two collections (Oregon, *Leiberg 367*; New Mexico, *Standley 7632*) of *P. Watsonii* and all had eight. (2). *P. Kelloggii* is very common in California but in the collections examined there were no plants with the same general aspect but with eight fertile stamens (*P. Watsonii*) from California. Likewise *P. Kelloggii* occurs in Nevada but no collections of *P. Watsonii* were seen from that state. *P. esotericum* occurs in California and has eight anther-bearing stamens but is readily distinguishable from *P. Kelloggii* by the slenderly cylindric inflorescence, white margins of the bracts, narrower achenes, and eight anther-bearing stamens; and from *P. Watsonii* by the characters already given in the key. Consequently there is both statistical and phytogeographic evidence that, while *P. Kelloggii* and *P. Watsonii* are often indistinguishable by habit and aspect, the difference in their numbers of fertile stamens is not due to either chance or vigor of the plants.

The two following species were published without designation of the precise specimen upon which they were based or the locality given was vague:

POLYGONUM MINIMUM S. Wats. in King, Rep. Geol. Expl. 40th Parallel 5: 315. 1871.

The TYPE, in Herb. Gray, came from Bear River Canyon, Uinta Mts., Utah, alt. 10,500 ft., Aug., 1869, *Sereno Watson 1058*.

POLYGONUM SHASTENSE Brewer in Proc. Am. Acad. 8: 400. 1873.

In view of the specific name it seems appropriate to take *Brewer 1382* from Mt. Shasta, Siskiyou Co., California, as the type. Brewer gives the following data in his field-notebooks: "1382 Polygonum. A nearly prostrate shrub. 8000' to 9000' alt.—fls. rose, deepest on midvein of petal. Stam. 8—(number inconstant ?) Stig. 3-cleft." Sept. 13 (?), 1862, not 1863 as stated on printed label-heading.

## VI. THALICTRUM POLYCARPUM S. WATS., A DISPUTED NAME

LOUIS C. WHEELER

There are two problems involved in this name: (1) What is the type? (2) Is the name available?



(1) *Thalictrum polycarpum* was published by Sereno Watson, Proc. Am. Acad. **14**: 288. 1879, in an article entitled: Descriptions of some new Species of North American Plants. In synonymy were cited: ". . . *T. Fendleri*, var. (?) *polycarpum*, Torr. in Pacif. R. Rep. 4. 61, in part. *T. Fendleri*, Brew. & Wats. Bot. Calif. 1.4, mainly." Watson's next reference to his species is Bot. Calif. **2**: 424. 1880, where he cites only the first synonym given above, again "in part." In the Synop. Fl. N. Am. **1**(1): 16. 1895, only the originally cited synonyms are given. In view of the fact that in no case did Watson state definitely on what part of *T. Fendleri* var. ? *polycarpum* his *T. polycarpum* was based and since he gave no indication of how he disposed of the remainder of the synonym, the species must, nomenclatorially, stand as Watson's solely rather than (Torr.) Watson. That means that the type must be sought at the Gray Herbarium. Davis, Minn. Bot. Studies, ser. 2, pt. **4**: 509-523. 1900 (Synonymic Conspectus of the Native and Garden *Thalictrums* of North America), does not consider the matter of types. The publication (by Torrey) in Pac. RR. Rep. **4**(5): 61. 1857, is as follows:

"*Thalictrum Fendleri*, Engelm. in Gray, Pl. Fendl. p. 5; var. ? *polycarpum*: glaberrimum; carpellis numerosioribus eglandulosis. Mountain ravines, New Mexico. In fruit October, &c. Sides of rivulets, Napa valley, California, April 25, (with immature fruit). It occurs in Coulter's California collection, in flower only . . ."

In *Plantae Fendlerianae* neither locality nor collection is cited for *Thalictrum Fendleri*. An examination of the specimens of *T. Fendleri* at the Gray Herbarium reveals that the species is evidently based on Fendler no. 13 in 1847 from New Mexico. Fendler's field notes (or a copy?) at the Gray Herbarium fail to elucidate matters. Someone, in the copy of the Pac. RR. Rep. 4 at the Gray Herbarium, has indicated that the New Mexican specimens belonged to *T. Fendleri*. But the field notes state: "Santa Fe, Creek-valley, shady places, margin of irrigating ditches at the foot of perpendic. rocks. 13th June-1st July in flower, 19th July in fruit". Since these data as to the type cannot be reconciled with "Mountain ravines, New Mexico. In fruit October, &c." there is no proof that there was any mistake made by Torrey, idem.

Watson applied *T. polycarpum* to a Californian entity and subsequent authors have followed him. The least confusion will be caused if the type chosen for *T. polycarpum* Wats. is the Napa Valley collection of Bigelow cited by Torrey under *T. Fendleri* var. ? *polycarpum*.



There is a specimen of this collection at the Gray Herbarium and I consider this the type of *T. polycarpum* Wats. An attempt was made to determine whether Torrey ever intended to apply the name *T. Fendleri* var. ? *polycarpum* to any New Mexican specimens. The folders of *T. Fendleri* and *polycarpum* at the New York Botanical Garden, where Torrey's herbarium is now kept, were examined. No specimens from New Mexico were labeled *T. Fendleri* var. ? *polycarpum*. But for that matter the Bigelow specimen from Napa Valley in 1853-4 was named only *T. Fendleri* Engelm. The Coulter specimen mentioned above was not found at New York. At the Gray Herbarium a sheet of the Bigelow collection is labeled *T. Fendleri* var. ? *polycarpum*. Also there is a staminate specimen collected by Coulter in California without date or number. This was originally labeled *T. Fendleri* but a later hand added *T. polycarpum*. It appears that Torrey may have sent his specimens to Asa Gray. Perhaps the Bigelow specimen at the Gray Herbarium should be considered the type of both *T. Fendleri* var. ? *polycarpum* Torrey and *T. polycarpum* Wats.

(2) Greene, *Muhlenbergia* 5: 128. 1909: "It is also now apparent that the name *T. polycarpum* is untenable. It had been chosen to designate an Old World member of the genus twenty years before Mr. Watson attempted to employ it. Since, then, the Watsonian type must be named anew, I shall take this occasion to give it a fuller description." The earlier *T. polycarpum* referred to by Greene was published by Loret, *Bull. Soc. Bot. Fr.* 6: 17. 1859, after describing the puzzling plant he was considering, in these words: "S'il m'était réservé de lui imposer un nom, je lui donnerais volontiers celui de *Th. polycarpum* ou mieux *multiflorum* . . ." Hence this is an illegitimate name of the type known as a *nomen provisorium*. Provisional names<sup>1</sup> are not only illegitimate but are not validly published.<sup>1</sup> Since they are not validly published they cannot, as earlier homonyms, invalidate a later name.<sup>2</sup> Lecoyer, *Bull. Soc. Bot. Belg.* 24: 78-324. 1885 (*Monogr. Thalictrum*), cites, p. 304, *T. polycarpum* Loret in synonymy and gives no adoption of the name by any other author. Hence *T. polycarpum* S. Watson is a valid name.

Greene, l. c., 129, published *T. ametrum* as a new name for *T. polycarpum* S. Watson. Jepson, *Flora Calif.* 1: 530. 1922, states, after

<sup>1</sup> See *Zesde Internat. Bot. Proc.* 1: 365. 1936; *Sprague, Jour. Bot.* 74: 75. 1936; & *Internat. Bot. Cong. 1930 Nomenclature Prop. Brit. Bot.*, 16-17, Art. 44. 1926, for discussion and examples.

<sup>2</sup> *Internat. Rules Bot. Nomencl. ed. 3, Art. 61.* 1935.



citing *T. ametrum* in synonymy, "type loc. seaward Coast Range." Evidently this was done under the misapprehension that *T. ametrum* was a new species rather than a new name.

## VII. THE TYPE OF THE GENUS *LEPIDOSPARTUM*

LOUIS C. WHEELER

The type species of *Lepidospartum* A. Gray is *Lynosyris squamata* A. Gray since, when the genus *Lepidospartum* was described, this was the only species assigned to it. So far there is no problem. What specimen should be taken as the type of the species is, however, something of a puzzle. Gray had only two specimens at the time he described it. This is evidenced by the fact that there are in the Gray Herbarium only two sheets bearing respectively the names *Lynosyris squamata* var. *Breweri* and *L. s.* var. *Palmeri*; all other sheets bear collection dates later than 1870, the year in which Gray described the two above varieties. To have designated two varieties from only two specimens leaves nothing as the type of the species according to our present ideas of proper typification. Gray himself seems to have given no hint of which element he considered the more typical. In no case that I can find did he reduce one variety to synonymy and maintain the other. In Syn. Fl. N. Am. 1(1): 378. 1884, he abandoned both varieties simultaneously, concluding that they "are mere varying forms." Abrams, Bull. N. Y. Bot. Gard. 6: 482. 1910 (Phyteographic & Taxonomic Study S. Calif. Trees & Shrubs), concludes that "We are therefore obliged to consider the Brewer plant as the type of the species, reducing the varietal name to synonymy." Evidently Abrams made his choice arbitrarily by priority of position as required by the now passé American Code. The International Rules provide that in the case of simultaneously published synonymous names, the author who first reduces one to a synonym of the other thereby determines which shall be used. This case of reduction by Abrams is unfortunately not quite parallel since he, idem, in his next sentence, reduced var. *Palmeri*: "The desert form, *Palmeri* does not seem distinct." It seems expedient to apply the unqualified specific name to the widespread entity. Therefore the Brewer specimen which represents this is taken as the type of the species *squamatum* which is the type of the genus *Lepidospartum*.

It is usual in modern monographic studies to designate by "var.



*typica*," or some similar non-transferable epithet, the typical variety (or other category ranking lower than specific) if one or more others are to be recognized. Here such a course is not open. The earliest varietal name for this entity is *Breweri* which is based on the type of the species *squamatum*. It is unfortunate that the Rules do not require either that "typica" be used to designate the typical entity or, perhaps better, that the specific epithet be repeated. The 1935 Rules, by inference from Recommendation 18, allow the use of any name to designate the typical entity in categories below specific rank. An absolute defect of the Rules is the unqualified requirement that the earliest available name as of that rank be used. This requires the use of many names designating the typical in lower-than-specific categories which are based on a type other than that of the species and which were intended to be different. Evidently this provision remains because of failure to correlate the type concept with the rules as to priority. The two are occasionally antagonistic. The priority rule should be modified to require the use of a name based on the same type as the species for any taxonomically identical subdivision of that species. Since this is not a monographic treatment and since a transfer might result in further nomenclatorial confusion I shall refrain from transferring the varietal epithet *Breweri* which is based on the type of the species.

The following key summarizes the differences between typical *Lepidospartum squamatum* and its var. *Palmeri*:

- Phyllaries mostly extending little onto the peduncles and stopping abruptly without grading into the scaly leaves; scaly leaves discrete on fertile stems.....*Lepidospartum squamatum*.  
 Phyllaries extending well down (5–8 mm.) the peduncles and grading into the scaly leaves; scaly leaves crowded on fertile stems.....*L. s.* var. *Palmeri*.

LEPIDOSPARTUM SQUAMATUM (A. Gray) A. Gray in Proc. Am. Acad. 19: 50. 1883, based on *Lynosyris squamata* A. Gray, l. c., 8: 290. 1870, no type designated, see above. *Carphephorus junceus* Benth. *sensu* Durand & Hilgard in Pacif. Rail. Rep. 5(3): 8. 1855. *Lynosyris squamata* A. Gray var. *Breweri* A. Gray, Proc. Am. Acad. 8: 290. 1870, TYPE: Low Hills of the Sierra Santa Monica, Los Angeles Co., California, W. H. Brewer 71 (Gray Herb.). *Tetradymia squamata* (A. Gray) A. Gray, l. c., 9: 207. 1874, *T. squamata* var. *Breweri* (A. Gray) A. Gray, Bot. Calif. 1: 408. 1876. *Baccharis sarothroides* A. Gray, var. *pluricephala* Jepson, Man. Fl. Pl. Calif., 1059. 1925;<sup>1</sup> type: Conchilla Mts., Piñon Well, Jepson 6008 (Herb. Jepson), not seen.

<sup>1</sup> Date on title-page questionable but here accepted for convenience as no conflict as to priority is involved.



Munz, Man. So. Calif. Bot., 576. 1935, included the last name, on Dr. S. F. Blake's advice, as a synonym. As I have not seen the type

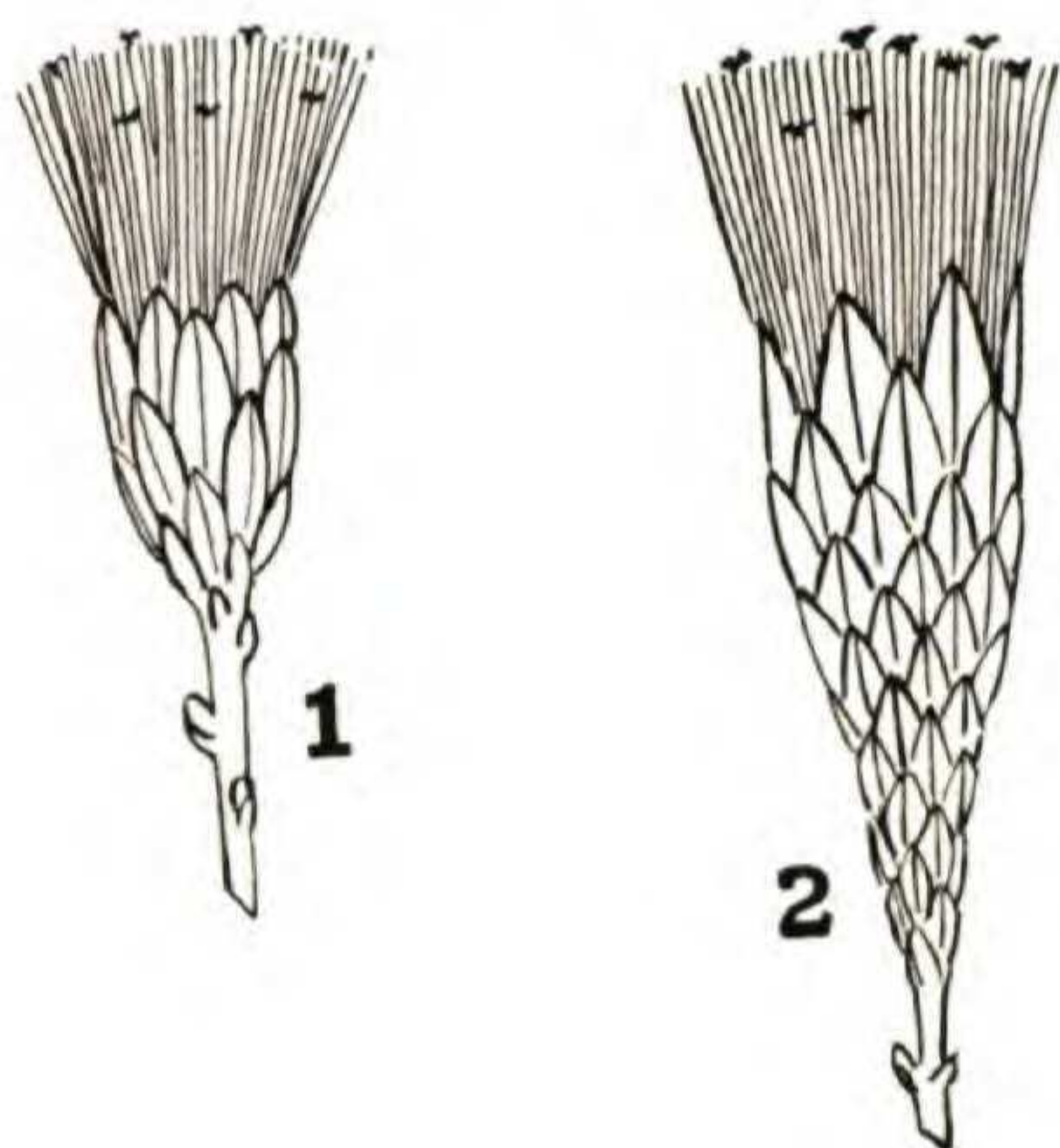


FIG. 1. *LEPIDOSPARTUM SQUAMATUM*, head  $\times 2$ . Drawn from *Duran 3367*, California (Herb. Gray). FIG. 2. Var. *PALMERI*, head  $\times 2$ , boiled in water to show phyllaries in natural position. Drawn from the type.

the name is included here in deference to Blake's judgment. Gray long ago commented on the strong resemblance between *Lepidospartum squamatum* and the sergilloid species of *Baccharis* which resemblance may explain Jepson's variety.

According to Brewer's field-notes preserved at the Gray Herbarium his number 71 was collected Dec. 21, 1860, in "Sierra Santa Monica from camp 3 near the sea. 71. Composite shrub common everywhere on the low hills, but more so in the cañons, generally entirely out of flower." According to W. H. Brewer's itinerary given by F. P. Farquhar, Up and Down

Calif., 571. 1930, camp 3 was in Santa Monica Canyon (1.5 miles from sea beach). This elucidates the type locality.

Typical *Lepidospartum squamatum* has been reported from: CALIFORNIA: southern Monterey Co.,<sup>1</sup> Tulare Co.,<sup>2</sup> Kern Co.,<sup>1</sup> Mohave & Colorado Deserts;<sup>1</sup> San Luis Obispo Co. to Lower Calif. and east to Arizona;<sup>2</sup> and Nevada.<sup>3</sup>

*LEPIDOSPARTUM SQUAMATUM* (A. Gray) A. Gray var. **Palmeri** (A. Gray) comb. nov. *Lynosyris squamata* var. *Palmeri* A. Gray in Proc. Am. Acad. 8: 290. 1870, TYPE: "Desert of the Colorado, Arizona," Dr. E. Palmer in 1870 (Gray Herb.).<sup>4</sup> *Tetradymia squamata* var. *Palmeri* A. Gray, Bot. Calif. 1: 408. 1876, proposed without direct reference to *Lynosyris squamata* var. *Palmeri* A. Gray but obviously identical. *Lepidospartum squamatum* var. *obtectum* Jepson, Man. Fl. Pl. Calif., 1159. 1925, type: Whitewater Wash, Riverside Co., Calif., Schellenger, (Herb. Jepson), not seen. Proposed without considering *Lepidospartum squamatum* var. *Palmeri*. Specimens seen: CALIFOR-

<sup>1</sup> Jepson, Man. Fl. Pl. Calif., 1159. 1925.

<sup>2</sup> Hall, Univ. Calif. Pub. Bot. 3: 222. 1907 (Comp. S. Calif.).

<sup>3</sup> Blake in Tidestrom, Contr. U. S. Nat. Herb. 25: 605. 1925.

<sup>4</sup> The Colorado Desert is in California, not Arizona. It appears probable that the type was actually collected near Whitewater, Riverside Co., Calif., for the variety is local in that region and, according to the itinerary kindly supplied by Dr. Blake, Palmer traversed the Whitewater area in 1870 on his way from Arizona to Los Angeles, California.